

SPGR Sub-Project Completion Report

Project Title

Coordinated Sub-Project on Characterization of Important Plant Genetic Resources: BSRI component

Duration: December 2011 to June 2014

Executing Organization

Bangladesh Sugarcane Research Institute
Ishurdi-6620, Pabna



Submitted to

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Executive Summary

Identification and documentation of germplasm is very important part for any crop improvement programme. In recent years it has been proved beyond doubt that only identification of varieties or germplasm by morphological traits is not adequate. The visible uniqueness is shown mostly through qualitative traits. Such traits can be seen and shown through appropriate photographic documentation for future use. Therefore, there is need for documentation of genetic resources with appropriate measures. Genetic Fingerprinting of varieties can indicate the unique position in addition to its morpho-physiological traits that are now being used criteria for variety release. Bangladesh Sugarcane Research Institute distinguishes the released varieties and its germplasm based on morphological identification. To accelerate the molecular characterization and documentation as time befitting need a National Coordinated Project deserves due attention.

Bangladesh Sugarcane Research Institute is maintaining more than 1105 germplasm in its gene bank. The sub-project aimed to characterize 100 (one hundred) sugarcane germplasm including 2 Geographical Indication (GI). For morphological characterization internationally accepted descriptor of National Plant Genetic Resources Laboratory – Phillipines Sugar Research Institute Foundation, Inc. have been used. Each year fifty (50) germplasm were planted in the field of Bangladesh Sugarcane Research Institute at Ishurdi, Pabna. At the age of 7-8 months of the plants data on eight main characters and photographs have been taken for all the accession. At the age of 10-12 months data was taken on other maturity characters. In total 2 GI, 29 varieties and 69 germplasm were studied under this sub-project. It was found that the stalk height ranged from 2.0m to 3.45m. Highest stalk height is observed for the germplasm SC 10d and lowest was found for CoL 29. Highest diameter was observed for Kajla (2.94 cm) and lowest was found for B 34-231 (1.70 cm). Longest leaf (170 cm) was observed in CPI 61-37 and BS 96 produced shortest leaf (113 cm) among the studied accession. Narrowest (2.30 cm) leaf was found in the accession BO 22 and broadest (5.50 cm) leaf was found in I 285-06. In case of brix it ranged from 16.5% to 22.2%. Photographs of morphological parts also showed distinctness within the studied accession. For molecular characterization molecular markers based DNA fingerprinting was done. The studied accession showed uniqueness in their banding pattern. Molecular characterization of 37 accession including 2 GI and 20 varieties has been done in the laboratory through DNA fingerprinting.

The collected data will help in identification and protection of sugarcane germplasm as national property as well as can be used in hybridization programme to develop new varieties of sugarcane.

1. Sub-Project title : Coordinated Sub-Project on Characterization of Important Plant Genetic Resources: BSRI Component.

2. Coordinator/Principal Investigator/Co-principal investigator :
 - a. Principal Investigator: K. M. Rezaul Karim
 - b. Co-Principal Investigator :Dr. Md. Amzad Hossain
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 - a. Principal Investigator:
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Dr. Md. Amzad Hossain, Chief Scientific Officer & Head, Biotechnology Division, Bangladesh Sugarcane Research Institute, Ishurdi-6620, Pabna. Phone: 07326-63414; Mobile 01718-426200
4. Duration : From December, 2011 to September 2013
5. Date of approval (by the Executive Council/signing of LoA) : 7 December, 2011
6. Total approved Budget (Taka): 2023220.00
Total fund received (Tk): 1474311.00
Total fund Spent (Tk): 1473778.00
Unspent/balance fund (Tk.): 533.00
Reason for the balance : Manpower has not been recruited
7. **Justification of undertaking the sub-project :**

Plant scientists are using morphological, pigmentation or other characteristics to classify and distinguish the uniqueness of new varieties for the purpose of variety protection. Most of the cases traits such as flower and pubescence, colour, leaf shape, growth habit, maturity, and other conventional morphological traits, together with disease, pest and stress resistance have been used to distinguish the uniqueness of new variety. Due to continuous development of a large number of varieties it became difficult to distinguish the variety by using morphological characters alone. It is thus apparent that the use of molecular genetic markers would provide one solution to the problem of providing unique DNA profile to distinguish uniqueness of new variety. Characterization and documentation of sugarcane varieties and germplasms including GI crops using morphological and molecular markers is important for identification and protection of them as national property and public domain which has been claim by this research project.
8. Project Objective(s):
 - i. To characterize sugarcane varieties and germplasm using morphological characters.
 - ii. To characterize for identification and documentation of sugarcane varieties and germplasm through DNA fingerprinting using molecular markers.
 - iii. Documentation and categorization of sugarcane germplasm for utilization in variety development with desirable traits.

9. Methodology followed:

- i) For morphological characterization germplasm were grown in the field and 7-8 and 10-12 months aged plants were used for Characterization as per descriptor
- ii) DNA extraction and purification was followed by the modified mini prep CTAB method. Three individual DNA samples from a cultivar or germplasm in equal volume and concentration was pooled to form the bulked samples.
- iii) Primers were used in PCR amplification following standard PCR profile.
- iv) Amplified DNA was run in agarose gel and polyacrylamide gel by electrophoresis to separate allele specific bands.
- v) Electrophoresis gel was documented for fingerprinting using gel documentation system, UV-transilluminator and digital camera as and where required.
- vi) Reproducible bands produced by the markers for specific desirable phenotypic traits was recorded for Marker Assisted Selection.
- vii) The BSRI-bred varieties, two GI crops as well as active germplasm those collected from home and abroad were used as experimental materials.

Bands Scoring and Data Analysis

The bands from documented gel was scored for or absence onto a computer and manually and independently by two people. Ambiguous data were discarded.

Morphological Data analysis

To compare differences among varieties/germplasm collected data was compiled and tabulated for further use

Name of crops and number of GI crops, variety, cultivar, genotypes as per PP

Name of crops	Target of characterization (as per PP)							
	GI		Cultivar		Variety		Germplasm	
	Mor.	Mol.	Mor.	Mol.	Mor.	Mol.	Mor.	Mol.
Sugarcane	2	2	--	--	29	29	69	69
Total	2	2	--	--	29	29	69	69

10. Results and discussion:

The sub-project aimed to characterize 100 (one hundred) sugarcane germplasm. For morphological characterization internationally accepted descriptor (Annexure-I) of National Plant Genetic Resources Laboratory – Phillipines Sugar Research Institute Foundation, Inc have been used. For molecular characterization molecular markers based DNA fingerprinting is being done. Each year fifty(50) germplasm were planted in the field. At the age of 7-8 months of the plants data on eight main characters including 46 parameters and photographs have been taken for all the accession. At the age of 10-12 months data was taken on other 12 characters. Molecular characterization of 37 accession has been done in the laboratory through DNA fingerprinting. The collected data will help in identification and protection of sugarcane germplasm as national property as well as can be used in hybridization programme to develop new variety. The table-1 shows some measurable parameters with the name of accession.

Table. 1: Studied germplasm with some measurable characters

Sl. No.	Name of the germplasm	Average stalk height (m)	Average diameter (cm)	Average Tiller/clump (Nos.)	Leaf length (cm)	Leaf Breadth (cm)	Brix (%)
1.	Misrimala	2.00	2.52	4.9	149	4.5	18.8
2.	Kajla	2.30	2.94	5.6	125	5.4	19.3
3.	Isd 1-53	2.85	1.89	9.8	135	2.50	19.7
4.	Isd 2-54	2.88	2.32	8.8	145	3.32	19.8
5.	BS 96	2.95	2.24	7.5	113	2.78	17.9
6.	Isd 16	3.15	2.85	8.1	155	5.00	20.7
7.	LJ-C	2.92	2.20	8.5	140	4.50	19.8
8.	Isd 17	2.85	2.35	6.6	119	3.63	19.4
9.	Isd 18	3.05	2.80	7.1	150	4.15	19.7
10.	Isd 19	2.50	2.65	6.0	155	4.75	20.0
11.	Isd 20	3.00	2.38	6.3	146	3.78	20.6
12.	Isd 21	3.07	2.68	6.9	136	4.75	19.8
13.	Isd 22	2.83	2.25	6.8	122	3.75	19.8
14.	Isd 24	2.84	2.65	5.6	148	4.40	19.0
15.	Isd 25	2.75	2.27	5.9	129	4.60	19.5
16.	Isd 26	3.05	2.81	7.9	156	4.48	21.0
17.	Isd 27	2.82	2.20	6.1	138	4.68	20.0
18.	Isd 28	3.25	2.70	7.3	163	4.35	20.7
19.	Isd 29	3.10	2.48	7.8	161	3.42	18.9
20.	Isd 30	2.66	2.62	8.0	155	4.73	19.8
21.	Isd 31	3.18	2.39	8.2	163	4.22	19.4
22.	Isd 32	2.90	2.80	7.8	153	4.51	18.5
23.	Isd 33	2.95	2.18	8.2	142	3.70	20.8
24.	Isd 34	2.68	2.19	8.9	148	3.81	20.3
25.	Isd 35	2.90	2.25	8.8	138	3.73	20.6
26.	Isd 36	2.87	2.22	8.1	140	4.33	21.0
27.	Isd 37	2.95	2.71	7.8	158	5.00	20.3
28.	Isd 38	3.00	2.59	7.9	154	4.00	19.8
29.	Isd 39	3.10	2.79	8.2	163	4.90	20.1
30.	Isd 40	3.07	2.75	7.8	159	5.10	19.9
31.	Isd 41	2.89	2.92	6.9	138	5.20	18.2
32.	B 34-231	2.80	1.70	7.8	126	3.10	18.9
33.	BC1	3.50	1.90	9.2	157	3.50	17.3
34.	BO 22	2.20	1.80	5.9	120	2.30	18.5
35.	BO 43	2.85	1.80	4.4	130	2.80	17.9
36.	CL 41-229	2.85	1.80	4.9	139	3.80	16.9
37.	Co 630	2.97	2.00	9.8	133	4.20	18.2

Sl. No.	Name of the germplasm	Average stalk height (m)	Average diameter (cm)	Average Tiller/clump (Nos.)	Leaf length (cm)	Leaf Breadth (cm)	Brix (%)
38.	Co 635	3.20	1.80	6.1	143	4.10	19.1
39.	Co 642	3.20	2.30	5.1	135	5.10	20.2
40.	CoL 29	2.00	2.10	5.6	155	3.30	19.5
41.	CP 61-37	2.90	2.40	6.2	170	3.00	22.2
42.	CP 75-361	3.20	2.40	4.3	132	4.40	22.1
43.	CP 69-1052	2.92	2.20	4.8	153	4.10	17.3
44.	CPI 96-80	2.85	1.90	5.8	146	4.20	18.8
45.	CP 36-105	2.80	1.80	4.9	128	2.60	17.2
46.	CP 53-33	2.40	1.80	5.2	123	2.70	18.1
47.	CP 44-101	2.90	2.20	6.4	142	3.20	18.2
48.	CP 75-361	2.60	2.20	6.1	147	3.20	20.1
49.	CP 70-1133	2.30	2.30	6.5	155	3.20	21.5
50.	I 101-66	2.80	1.90	6.2	128	3.80	19.2
51.	I 134-70	2.90	2.40	4.95	128	2.80	18.2
52.	I 4-71	3.00	2.00	7.0	163	3.50	22.0
53.	I 33-78	2.80	2.30	6.9	150	2.90	18.2
54.	I 68-78	2.80	1.90	6.2	128	3.00	20.1
55.	I 91-79	3.41	1.90	4.9	159	3.79	17.2
56.	I 25-80	2.60	2.40	5.9	132	3.00	18.5
57.	I 562-85	3.35	1.80	5.1	148	3.20	17.9
58.	I 19-86	3.10	2.20	6.4	165	3.30	17.1
59.	I 144-86	3.00	2.40	8.5	169	3.50	19.3
60.	I 323-86	3.10	1.90	6.0	160	2.30	19.0
61.	I 326-86	3.30	1.90	5.8	167	4.00	20.2
62.	I 80-93	2.50	1.90	5.9	137	3.50	19.2
63.	I 174-93	3.20	2.50	4.5	139	4.80	18.6
64.	I 14-96	2.95	1.90	6.4	161	3.40	19.2
65.	I 127-96	3.00	1.90	8.4	152	3.00	19.1
66.	I 137-96	3.19	2.10	6.8	147	3.90	18.3
67.	I 200-96	2.90	1.80	7.2	145	3.10	19.3
68.	I 33-97	3.20	2.10	5.8	143	4.50	17.1
69.	I 156-97	2.35	2.00	4.8	122	4.00	18.5
70.	I 64-98	2.90	2.00	5.3	126	4.30	20.2
71.	I 82-98	3.20	1.80	5.9	115	3.20	20.1
72.	I 98-98	2.70	2.00	6.4	120	3.00	19.2
73.	I 21-00	2.89	2.10	5.2	137	3.41	20.4
74.	I 40-00	2.64	2.10	5.1	162	4.30	19.9
75.	I 92-00	2.70	1.71	6.3	130	2.80	17.9
76.	I 68-01	2.90	1.80	6.5	142	3.00	21.2
77.	I 108-01	3.30	2.10	6.1	162	3.90	18.2
78.	I 84-03	2.90	2.10	7.2	142	3.30	19.1
79.	I 111-03	2.35	1.90	4.7	143	4.10	18.2
80.	I 221-03	3.10	2.30	7.4	163	4.90	20.2
81.	I 6-04	3.10	2.00	5.5	165	4.90	18.5
82.	I 39-04	2.95	2.10	4.1	128	4.20	18.0
83.	I 282-04	2.40	1.90	5.8	159	2.80	18.9
84.	I 189-04	2.95	1.90	6.7	162	4.80	19.3
85.	I 1-05	3.00	2.20	7.1	165	4.80	21.0
86.	I 285-06	3.10	2.10	6.3	128	5.50	16.5
87.	I 71-07	2.80	2.00	7.2	155	4.90	20.0

Sl. No.	Name of the germplasm	Average stalk height (m)	Average diameter (cm)	Average Tiller/clump (Nos.)	Leaf length (cm)	Leaf Breadth (cm)	Brix (%)
88.	I 93-07	2.90	2.00	6.2	158	4.00	19.5
89.	I 213-07	2.90	2.20	5.5	162	4.90	18.2
90.	I 25-08	2.80	1.90	7.8	115	3.50	18.2
91.	IC 7a	3.41	2.10	4.8	153	3.90	19.9
92.	IC 3c	3.30	2.20	6.9	155	3.80	18.1
93.	IC 14c	3.10	2.60	7.5	158	4.00	18.5
94.	IC 1d	2.80	2.10	8.1	152	3.10	19.5
95.	Saipan 17	3.40	2.30	4.9	142	3.40	18.1
96.	SC 5d	2.85	2.20	6.4	153	4.30	17.9
97.	SC 5b	3.35	1.90	6.8	132	4.20	19.2
98.	SC 10d	3.45	2.20	6.4	148	3.90	20.1
99.	SC 2d	3.10	1.90	5.2	152	4.30	20.2
100.	ZH 110-65	2.90	2.30	5.9	162	3.10	21.2

From the above table it was observed that the range for stalk height was from 2.0m to 3.45m. Highest stalk height was observed for the germplasm SC10d and lowest was found for CoL 29. Highest diameter was observed for Kajla (2.94cm) and lowest was found for B 34-231(1.70cm). Longest leaf (170cm) was observed in CPI 61-37 and BS 96 produced shortest leaf (113cm) among the studied accession. Narrowest (2.30cm)leaf was found in the accession BO 22 and broadest (5.50cm) leaf was found in I 285-06. In case of brix it ranged from 16.5% to 22.2%. Photographs with description has been presented in this report.

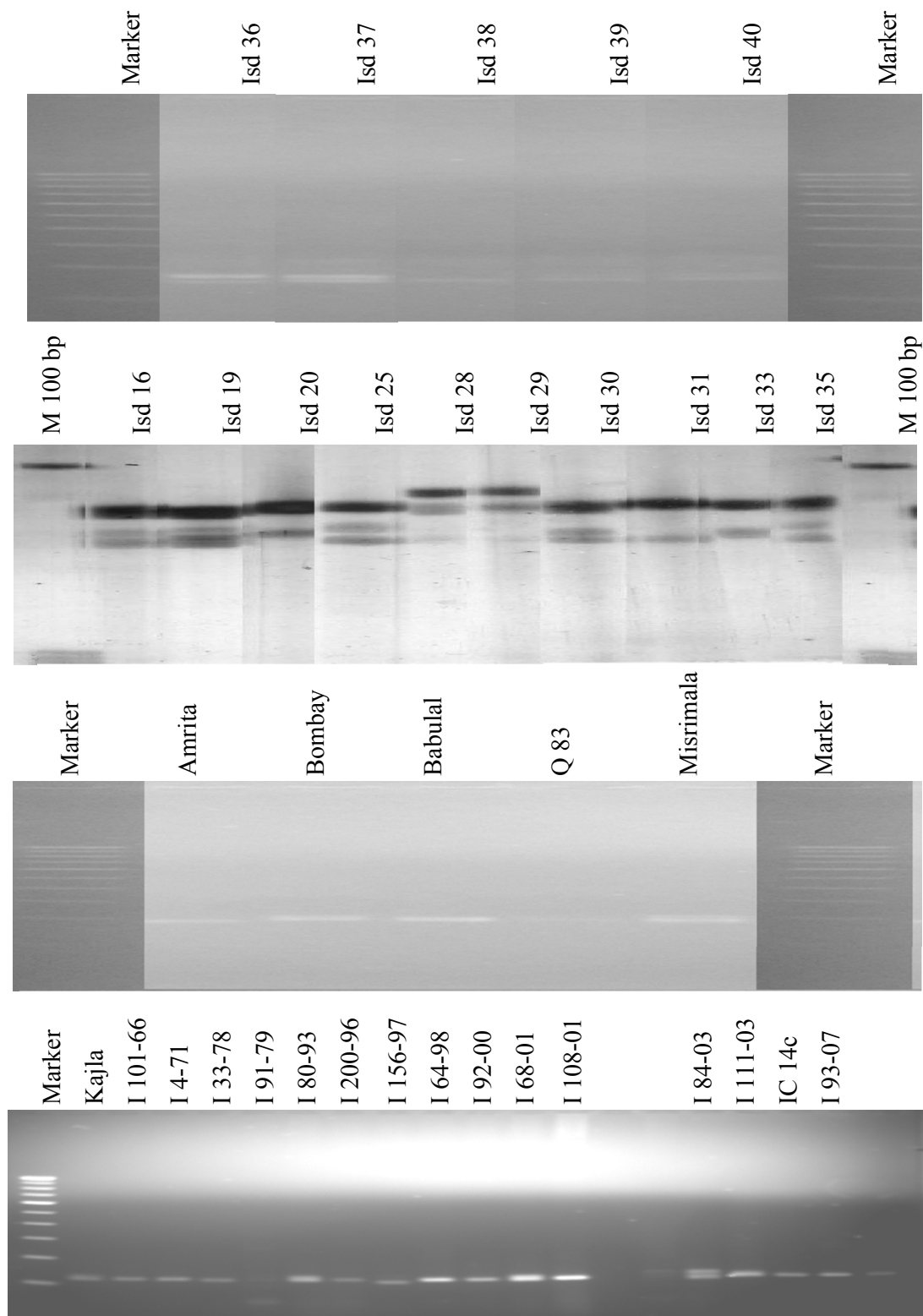


Fig.: DNA Fingerprinting of 37 sugarcane genotypes

Accession No.: 01

Name of the GI sugarcane : **Misrimala**

Historical background: This cultivar of sugarcane is commercially cultivated in Motlob area under Chandpur district. It is also sporadically planted in homesteads of other areas of the zilla. Mr. Nizam Uddin Mal, S/o: Ibrahim Hossain Mal and Md. Akhter Hossain C/o Md. Solaiman Sikder of Kolakanda area informed that their grandfather and the ancestor cultivated the same chewing cane in that locality at least 90 to 100 years ago. Their comments were supported by Hazi Md. Mussarof Ali (70 years) of the same village.

Passport descriptors		
Variety/Cultivar	:	Misrimala
Collecting Institute	:	Bangladesh Sugarcane Research Institute
Country of origin	:	Bangladesh
Name of farmer	:	Md. Nizam Uddin Mal
Location of collecting site	:	Vill: West Hanir Par, Union: Kolakanda, Upazila: Motlab, Dist: Chandpur
Latitude of collecting site	:	23 ⁰ 9.0' N
Longitude of collecting site	:	90 ⁰ 43.0' E
Commercial value	:	High
Cultivation practices	:	Homestead and commercial fields
Area coverage	:	30 ha



Fig.: Misrimala in the field

Morphological characters of the GI

❖ Plant habit	:	Erect
❖ Tillering habit	:	Compact
❖ Tops	:	Light
❖ Leaf carriage	:	Compact
❖ Trashiness	:	Clinging
❖ Leaf blade texture	:	Smooth
❖ Leaf erectness	:	Curved near middle
❖ Leaf sheath waxiness	:	Absent
❖ Presence of prickles/trichomes	:	Few
❖ Prickle/trichome quality	:	Hard
❖ Persistence of prickles/trichomes	:	Non-deciduous
❖ Outer auricle shape	:	Sloping transitional
❖ Inner auricle shape	:	Straight transitional
❖ Dewlap waxiness	:	Light
❖ Dewlap shape	:	More or less triangular, sloping, with horizontal upper margin
❖ Ligule shape	:	Broad crescent
❖ Stripes on cane	:	Absent
❖ Splits/growth cracks	:	Absent
❖ Corky cracks	:	Absent
❖ Corky patch	:	Absent
❖ Internode shape	:	Cylindrical
❖ Alignment	:	Straight
❖ Node swelling	:	Not swollen
❖ Growth ring width	:	Narrow
❖ Number of root primordia	:	Two rows
❖ Leaf scar prominence	:	Not prominent
❖ Root band shape	:	Straight
❖ Bud shape	:	Round with central germ pore
❖ Bud prominence	:	Flat
❖ Bud groove/furrow expression	:	High
❖ Bud tip position	:	On growth ring
❖ Bud base position	:	At leaf scar
❖ Number of internodes	:	Seventeen
❖ Solidness	:	Solid



Fig: Top



Fig: Internode



Fig: Auricle

Accession No.: 02

Name of the GI sugarcane : **Kajla**

Historical background: This is a chewing type sugarcane cultivar. The market value of this cane is high due to its softness and some other chewing characters. This cultivar of sugarcane is commercially cultivated in some areas of Hobigonj district. It is also sporadically cultivated in some areas of the Bangladesh, especially in Manikgonj. Mr. Morhaz Mia, S/o: Late Nembor Ali of Guntia village narrated that their family is cultivating the chewing cane since a long ago. His grandfather also stated various qualities of this cane and cultivated them for commercial purpose before 80 to 90 years ago. His description were supported by Md. Abdur Rouf (65 years) of that area.

Passport descriptors		
Variety/Cultivar	:	Kajla
Collecting Institute	:	Bangladesh Sugarcane Research Institute
Country of origin	:	Bangladesh
Name of farmer	:	Md. Morhaz Mia
Location of collecting site	:	Vill: Guntia, Post+ Upazila: Madhobkundo, Dist: Hobigonj
Latitude of collecting site	:	24 ⁰ 23.0' N
Longitude of collecting site	:	91 ⁰ 25.0' E
Commercial value	:	High
Cultivation practices	:	Homestead and commercial fields
Area coverage	:	35 ha



Fig.: Kajla in the field

Morphological characters of the GI

❖ Plant habit	:	Intermediate
❖ Tillering habit	:	Compact
❖ Tops	:	Heave
❖ Leaf carriage	:	Compact
❖ Trashiness	:	Intermediate
❖ Leaf blade texture	:	Smooth
❖ Leaf Erectness	:	Curved near middle
❖ Leaf sheath waxiness	:	Light
❖ Presence of prickles/trichomes	:	Absent
❖ Prickle/trichome quality	:	Absent
❖ Persistence of prickles/trichomes	:	Absent
❖ Outer auricle shape	:	Straight transitional
❖ Inner auricle shape	:	Straight transitional
❖ Dewlap waxiness	:	Light
❖ Dewlap shape	:	Triangular with horizontal basal margin
❖ Ligule shape	:	Broad crescent
❖ Stripes on cane	:	Absent
❖ Splits/growth cracks	:	Absent
❖ Corky cracks	:	Absent
❖ Corky patch	:	Absent
❖ Internode shape	:	Cylindrical
❖ Alignment	:	Zigzag
❖ Node swelling	:	Swollen
❖ Growth ring width	:	Narrow
❖ Number of root primordia	:	Two rows
❖ Leaf scar prominence	:	Prominent
❖ Root band shape	:	Obconoidal
❖ Bud shape	:	Round with central germ pore
❖ Bud prominence	:	Bulging
❖ Bud groove/furrow expression	:	Low
❖ Bud tip position	:	On growth ring
❖ Bud base position	:	At leaf scar
❖ Number of internodes	:	Twenty five
❖ Solidness	:	Hollow



Fig: Top



Fig: Internode



Fig: Auricle

Accession No.: 03

Name of the variety : **Isd 1-53**

Morphological characters of the variety

❖ Plant habit	:	Erect
❖ Tillering habit	:	Compact
❖ Tops	:	Light
❖ Leaf carriage	:	Compact
❖ Trashiness	:	Intermediate
❖ Leaf blade texture	:	Smooth
❖ Leaf Erectness	:	Curved near middle
❖ Leaf sheath waxiness	:	Light
❖ Presence of prickles/trichomes	:	Few
❖ Prickle/trichome quality	:	Soft
❖ Persistence of prickles/trichomes	:	Deciduous
❖ Outer auricle shape	:	Short lanceolate
❖ Inner auricle shape	:	Sloping transitional
❖ Dewlap waxiness	:	Light
❖ Dewlap shape	:	Triangular with horizontal basal margin
❖ Ligule shape	:	Broad crescent
❖ Stripes on cane	:	Absent
❖ Splits/growth cracks	:	Absent
❖ Corky cracks	:	Absent
❖ Corky patch	:	Absent
❖ Internode shape	:	Conoidal
❖ Alignment	:	Straight
❖ Node swelling	:	Swollen
❖ Growth ring width	:	Narrow
❖ Number of root primordia	:	Two rows
❖ Leaf scar prominence	:	Prominent
❖ Root band shape	:	Obconoidal
❖ Bud shape	:	Round with central germ pore
❖ Bud prominence	:	Flat
❖ Bud groove/furrow expression	:	Absent
❖ Bud tip position	:	On growth ring
❖ Bud base position	:	At leaf scar
❖ Number of internodes	:	Twenty four
❖ Solidness	:	Solid



Fig: Top



Fig: Internode



Fig: Auricle

Accession No.: 04

Name of the variety : **Isd 2-54**

Morphological characters of the variety

❖ Plant habit	:	Intermediate
❖ Tillering habit	:	Compact
❖ Tops	:	Light
❖ Leaf carriage	:	Compact
❖ Trashiness	:	Intermediate
❖ Leaf blade texture	:	Smooth
❖ Leaf Erectness	:	Curved near middle
❖ Leaf sheath waxiness	:	Light
❖ Presence of prickles/trichomes	:	Absent
❖ Prickle/trichome quality	:	Absent
❖ Persistence of prickles/trichomes	:	Absent
❖ Outer auricle shape	:	Straight transitional
❖ Inner auricle shape	:	Sloping transitional
❖ Dewlap waxiness	:	Light
❖ Dewlap shape	:	Triangular with horizontal basal margin
❖ Ligule shape	:	Broad crescent
❖ Stripes on cane	:	Absent
❖ Splits/growth cracks	:	Absent
❖ Corky cracks	:	Absent
❖ Corky patch	:	Absent
❖ Internode shape	:	Cylindrical
❖ Alignment	:	Straight
❖ Node swelling	:	Not-swollen
❖ Growth ring width	:	Narrow
❖ Number of root primordia	:	Two rows
❖ Leaf scar prominence	:	Prominent
❖ Root band shape	:	Straight
❖ Bud shape	:	Simple ovate
❖ Bud prominence	:	Flat
❖ Bud groove/furrow expression	:	Absent
❖ Bud tip position	:	On growth ring
❖ Bud base position	:	At leaf scar
❖ Number of internodes	:	Twenty six
❖ Solidness	:	Solid



Fig: Top



Fig: Internode



Fig: Auricle

Accession No.: 05

Name of the variety : **BS 96**

Morphological characters of the variety

❖ Plant habit	:	Erect
❖ Tillering habit	:	Compact
❖ Tops	:	Light
❖ Leaf carriage	:	Open
❖ Trashiness	:	Clinging
❖ Leaf blade texture	:	Smooth
❖ Leaf Erectness	:	Erect to tip
❖ Leaf sheath waxiness	:	Light
❖ Presence of prickles/trichomes	:	Few
❖ Prickle/trichome quality	:	soft
❖ Persistence of prickles/trichomes	:	Deciduous
❖ Outer auricle shape	:	Straight transitional
❖ Inner auricle shape	:	Straight transitional
❖ Dewlap waxiness	:	Light
❖ Dewlap shape	:	Triangular with horizontal basal margin
❖ Ligule shape	:	Broad crescent
❖ Stripes on cane	:	Absent
❖ Splits/growth cracks	:	Present
❖ Corky cracks	:	Absent
❖ Corky patch	:	Absent
❖ Internode shape	:	Cylindrical
❖ Alignment	:	Straight
❖ Node swelling	:	Swollen
❖ Growth ring width	:	Narrow
❖ Number of root primordia	:	Two rows
❖ Leaf scar prominence	:	Prominent
❖ Root band shape	:	Straight
❖ Bud shape	:	Simple ovate
❖ Bud prominence	:	Flat
❖ Bud groove/furrow expression	:	Absent
❖ Bud tip position	:	On growth ring
❖ Bud base position	:	At leaf scar
❖ Number of internodes	:	Twenty three
❖ Solidness	:	Hollow



Fig: Top



Fig: Internode



Fig: Auricle

Accession No.: 06

Name of the variety : **Isd 16**

Morphological characters of the variety

❖ Plant habit	:	Erect
❖ Tillering habit	:	Spreading
❖ Tops	:	Light
❖ Leaf carriage	:	Compact
❖ Trashiness	:	Intermediate
❖ Leaf blade texture	:	Smooth
❖ Leaf Erectness	:	Curved near tip
❖ Leaf sheath waxiness	:	Medium
❖ Presence of prickles/trichomes	:	Absent
❖ Prickle/trichome quality	:	Absent
❖ Persistence of prickles/trichomes	:	Absent
❖ Outer auricle shape	:	Long lanceolate
❖ Inner auricle shape	:	Deltoid
❖ Dewlap waxiness	:	Medium
❖ Dewlap shape	:	Vey sloping narrow, triangular legulate
❖ Ligule shape	:	Deltoid
❖ Stripes on cane	:	Absent
❖ Splits/growth cracks	:	Absent
❖ Corky cracks	:	Absent
❖ Corky patch	:	Absent
❖ Internode shape	:	Cylindrical
❖ Alignment	:	Straight
❖ Node swelling	:	Not swollen
❖ Growth ring width	:	Narrow
❖ Number of root primordia	:	Two rows
❖ Leaf scar prominence	:	Prominent
❖ Root band shape	:	Straight
❖ Bud shape	:	Round with central germ pore
❖ Bud prominence	:	Bulging
❖ Bud groove/furrow expression	:	High
❖ Bud tip position	:	Above growth ring
❖ Bud base position	:	At leaf scar
❖ Number of internodes	:	Twenty nice
❖ Solidness	:	Hollow



Fig: Top



Fig: Internode

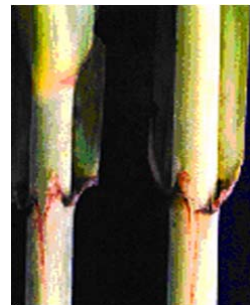


Fig: Auricle

Accession No.: 07

Name of the variety : **LJ-C**

Morphological characters of the variety

❖ Plant habit	:	Intermediate
❖ Tillering habit	:	Compact
❖ Tops	:	Light
❖ Leaf carriage	:	Compact
❖ Trashiness	:	Clinging
❖ Leaf blade texture	:	Smooth
❖ Leaf Erectness	:	Curved near middle
❖ Leaf sheath waxiness	:	Light
❖ Presence of prickles/trichomes	:	Absent
❖ Prickle/trichome quality	:	Absent
❖ Persistence of prickles/trichomes	:	Absent
❖ Outer auricle shape	:	Straight transitional
❖ Inner auricle shape	:	Short lanceolate
❖ Dewlap waxiness	:	Light
❖ Dewlap shape	:	Triangular with horizontal basal margin
❖ Ligule shape	:	Broad crescent
❖ Stripes on cane	:	Absent
❖ Splits/growth cracks	:	Absent
❖ Corky cracks	:	Absent
❖ Corky patch	:	Absent
❖ Internode shape	:	Cylindrical
❖ Alignment	:	Straight
❖ Node swelling	:	Swollen
❖ Growth ring width	:	Narrow
❖ Number of root primordia	:	Two rows
❖ Leaf scar prominence	:	Prominent
❖ Root band shape	:	Obconoidal
❖ Bud shape	:	Round with central germ pore
❖ Bud prominence	:	Flat
❖ Bud groove/furrow expression	:	Absent
❖ Bud tip position	:	On growth ring
❖ Bud base position	:	At leaf scar
❖ Number of internodes	:	Twenty Eight
❖ Solidness	:	Solid



Fig: Top



Fig: Internode



Fig: Auricle

Accession No.: 08

Name of the variety : **Isd 17**

Morphological characters of the variety

❖ Plant habit	:	Intermediate
❖ Tillering habit	:	Compact
❖ Tops	:	Heave
❖ Leaf carriage	:	Compact
❖ Trashiness	:	Intermediate
❖ Leaf blade texture	:	Smooth
❖ Leaf Erectness	:	Curved near middle
❖ Leaf sheath waxiness	:	Light
❖ Presence of prickles/trichomes	:	Absent
❖ Prickle/trichome quality	:	Absent
❖ Persistence of prickles/trichomes	:	Absent
❖ Outer auricle shape	:	Sloping transitional
❖ Inner auricle shape	:	Dentoid
❖ Dewlap waxiness	:	Light
❖ Dewlap shape	:	Triangular
❖ Ligule shape	:	Broad crescent
❖ Stripes on cane	:	Absent
❖ Splits/growth cracks	:	Absent
❖ Corky cracks	:	Absent
❖ Corky patch	:	Absent
❖ Internode shape	:	Cylindrical
❖ Alignment	:	Straight
❖ Node swelling	:	Swollen
❖ Growth ring width	:	Narrow
❖ Number of root primordia	:	Two rows
❖ Leaf scar prominence	:	Prominent
❖ Root band shape	:	Straight
❖ Bud shape	:	Simple ovate
❖ Bud prominence	:	Flat
❖ Bud groove/furrow expression	:	Absent
❖ Bud tip position	:	On growth ring
❖ Bud base position	:	At leaf scar
❖ Number of internodes	:	Twenty six
❖ Solidness	:	Solid



Fig: Top



Fig: Internode



Fig: Auricle

Accession No.: 09

Name of the variety : **Isd 18**

Morphological characters of the variety

❖ Plant habit	:	Intermediate
❖ Tillering habit	:	Compact
❖ Tops	:	Heavy
❖ Leaf carriage	:	Compact
❖ Trashiness	:	Intermediate
❖ Leaf blade texture	:	Smooth
❖ Leaf Erectness	:	Erect to tip
❖ Leaf sheath waxiness	:	Light
❖ Presence of prickles/trichomes	:	Absent
❖ Prickle/trichome quality	:	Absent
❖ Persistence of prickles/trichomes	:	Absent
❖ Outer auricle shape	:	Straight transitional
❖ Inner auricle shape	:	Sloping transitional
❖ Dewlap waxiness	:	Light
❖ Dewlap shape	:	Triangular with horizontal basal margin
❖ Ligule shape	:	Broad crescent
❖ Stripes on cane	:	Absent
❖ Splits/growth cracks	:	Absent
❖ Corky cracks	:	Absent
❖ Corky patch	:	Absent
❖ Internode shape	:	Conoidal
❖ Alignment	:	Straight
❖ Node swelling	:	Swollen
❖ Growth ring width	:	Narrow
❖ Number of root primordia	:	Two rows
❖ Leaf scar prominence	:	Prominent
❖ Root band shape	:	Straight
❖ Bud shape	:	Simple ovate
❖ Bud prominence	:	Flat
❖ Bud groove/furrow expression	:	Absent
❖ Bud tip position	:	On growth ring
❖ Bud base position	:	At leaf scar
❖ Number of internodes	:	Twenty six
❖ Solidness	:	Solid

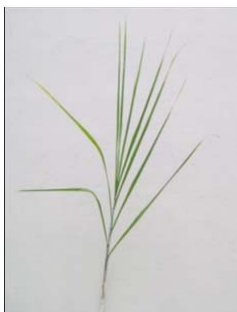


Fig: Top



Fig: Internode



Fig: Auricle

Accession No.: 10

Name of the variety : **Isd 19**

Morphological characters of the variety

❖ Plant habit	:	Erect
❖ Tillering habit	:	Spreading
❖ Tops	:	Light
❖ Leaf carriage	:	Compact
❖ Trashiness	:	Free
❖ Leaf blade texture	:	Smooth
❖ Leaf Erectness	:	Erect to tip
❖ Leaf sheath waxiness	:	Meduim
❖ Presence of prickles/trichomes	:	Absent
❖ Prickle/trichome quality	:	Absent
❖ Persistence of prickles/trichomes	:	Absent
❖ Outer auricle shape	:	Deltoid
❖ Inner auricle shape	:	Straight transitional
❖ Dewlap waxiness	:	Light
❖ Dewlap shape	:	Tall, triangular with convex upper and lower margins
❖ Ligule shape	:	Linear crescent
❖ Stripes on cane	:	Absent
❖ Splits/growth cracks	:	Absent
❖ Corky cracks	:	Absent
❖ Corky patch	:	Present
❖ Internode shape	:	Conoidal
❖ Alignment	:	Straight
❖ Node swelling	:	Not swollen
❖ Growth ring width	:	Narrow
❖ Number of root primordia	:	Two rows
❖ Leaf scar prominence	:	Prominent
❖ Root band shape	:	Obconoidal
❖ Bud shape	:	Roundish with wings
❖ Bud prominence	:	Flat
❖ Bud groove/furrow expression	:	Absent
❖ Bud tip position	:	On growth ring
❖ Bud base position	:	Above leaf scar
❖ Number of internodes	:	Twenty three
❖ Solidness	:	Solid



Fig: Top



Fig: Internode



Fig: Auricle

Accession No.: 11

Name of the variety : **Isd 20**

Morphological characters of the variety

❖ Plant habit	:	Erect
❖ Tillering habit	:	Spreading
❖ Tops	:	Light
❖ Leaf carriage	:	Compact
❖ Trashiness	:	Intermediate
❖ Leaf blade texture	:	Smooth
❖ Leaf Erectness	:	Curved near tip
❖ Leaf sheath waxiness	:	Medium
❖ Presence of prickles/trichomes	:	Absent
❖ Prickle/trichome quality	:	Absent
❖ Persistence of prickles/trichomes	:	Absent
❖ Outer auricle shape	:	Deltoid
❖ Inner auricle shape	:	Dentoid
❖ Dewlap waxiness	:	Medium
❖ Dewlap shape	:	Tall, triangular with convex upper and lower margins
❖ Ligule shape	:	Crescent with lozenge
❖ Stripes on cane	:	Absent
❖ Splits/growth cracks	:	Absent
❖ Corky cracks	:	Absent
❖ Corky patch	:	Absent
❖ Internode shape	:	Conoidal
❖ Alignment	:	Straight
❖ Node swelling	:	Swollen
❖ Growth ring width	:	Narrow
❖ Number of root primordia	:	Three rows
❖ Leaf scar prominence	:	Prominent
❖ Root band shape	:	Obconoidal
❖ Bud shape	:	Ovate with secondary wings
❖ Bud prominence	:	Flat
❖ Bud groove/furrow expression	:	Low
❖ Bud tip position	:	Below growth ring
❖ Bud base position	:	At leaf scar
❖ Number of internodes	:	Twenty seven
❖ Solidness	:	Solid



Fig: Top



Fig: Internode



Fig: Auricle

Accession No.: 12

Name of the variety : **Isd 21**

Morphological characters of the variety

❖ Plant habit	:	Intermediate
❖ Tillering habit	:	Compact
❖ Tops	:	Light
❖ Leaf carriage	:	Compact
❖ Trashiness	:	Intermediate
❖ Leaf blade texture	:	Smooth
❖ Leaf Erectness	:	Curved near middle
❖ Leaf sheath waxiness	:	Light
❖ Presence of prickles/trichomes	:	Few
❖ Prickle/trichome quality	:	Soft
❖ Persistence of prickles/trichomes	:	Non-deciduous
❖ Outer auricle shape	:	Dentoid
❖ Inner auricle shape	:	Straight transitional
❖ Dewlap waxiness	:	Light
❖ Dewlap shape	:	Triangular with horizontal basal margin
❖ Ligule shape	:	Broad crescent
❖ Stripes on cane	:	Absent
❖ Splits/growth cracks	:	Absent
❖ Corky cracks	:	Absent
❖ Corky patch	:	Absent
❖ Internode shape	:	Conoidal
❖ Alignment	:	Straight
❖ Node swelling	:	Swollen
❖ Growth ring width	:	Narrow
❖ Number of root primordia	:	Two rows
❖ Leaf scar prominence	:	Prominent
❖ Root band shape	:	Straight
❖ Bud shape	:	Simple ovate
❖ Bud prominence	:	Bulging
❖ Bud groove/furrow expression	:	Absent
❖ Bud tip position	:	On growth ring
❖ Bud base position	:	At leaf scar
❖ Number of internodes	:	Twenty three
❖ Solidness	:	Solid



Fig: Top



Fig: Internode



Fig: Auricle

Accession No.: 13

Name of the variety : **Isd 22**

Morphological characters of the variety

❖ Plant habit	:	Intermediate
❖ Tillering habit	:	Compact
❖ Tops	:	Light
❖ Leaf carriage	:	Compact
❖ Trashiness	:	Intermediate
❖ Leaf blade texture	:	Smooth
❖ Leaf Erectness	:	Curved near tip
❖ Leaf sheath waxiness	:	Light
❖ Presence of prickles/trichomes	:	Absent
❖ Prickle/trichome quality	:	Absent
❖ Persistence of prickles/trichomes	:	Absent
❖ Outer auricle shape	:	Straight transitional
❖ Inner auricle shape	:	Straight transitional
❖ Dewlap waxiness	:	Light
❖ Dewlap shape	:	Triangular with horizontal basal margin
❖ Ligule shape	:	Broad crescent
❖ Stripes on cane	:	Absent
❖ Splits/growth cracks	:	Present
❖ Corky cracks	:	Absent
❖ Corky patch	:	Absent
❖ Internode shape	:	Cylindrical
❖ Alignment	:	Zig-zag
❖ Node swelling	:	Swollen
❖ Growth ring width	:	Narrow
❖ Number of root primordia	:	Two rows
❖ Leaf scar prominence	:	Prominent
❖ Root band shape	:	Obconoidal
❖ Bud shape	:	Roundish with wings
❖ Bud prominence	:	Flat
❖ Bud groove/furrow expression	:	Absent
❖ Bud tip position	:	On growth ring
❖ Bud base position	:	At leaf scar
❖ Number of internodes	:	Twenty five
❖ Solidness	:	Solid



Fig: Top



Fig: Internode



Fig: Auricle

Accession No.: 14

Name of the variety : **Isd 24**

Morphological characters of the variety

❖ Plant habit	:	Intermediate
❖ Tillering habit	:	Compact
❖ Tops	:	Heavy
❖ Leaf carriage	:	Compact
❖ Trashiness	:	Intermediate
❖ Leaf blade texture	:	Smooth
❖ Leaf Erectness	:	Curved near tip
❖ Leaf sheath waxiness	:	Light
❖ Presence of prickles/trichomes	:	Many
❖ Prickle/trichome quality	:	Hard
❖ Persistence of prickles/trichomes	:	Non-deciduous
❖ Outer auricle shape	:	Straight transitional
❖ Inner auricle shape	:	Straight transitional
❖ Dewlap waxiness	:	Light
❖ Dewlap shape	:	Triangular with horizontal basal margin
❖ Ligule shape	:	Broad crescent
❖ Stripes on cane	:	Absent
❖ Splits/growth cracks	:	Absent
❖ Corky cracks	:	Absent
❖ Corky patch	:	Absent
❖ Internode shape	:	Conoidal
❖ Alignment	:	Straight
❖ Node swelling	:	Swollen
❖ Growth ring width	:	Narrow
❖ Number of root primordia	:	Two rows
❖ Leaf scar prominence	:	Prominent
❖ Root band shape	:	Obconoidal
❖ Bud shape	:	Roundish with wings
❖ Bud prominence	:	Bulging
❖ Bud groove/furrow expression	:	Absent
❖ Bud tip position	:	On growth ring
❖ Bud base position	:	At leaf scar
❖ Number of internodes	:	Twenty Two
❖ Solidness	:	Solid



Fig: Top



Fig: Internode



Fig: Auricle

Accession No.: 15

Name of the variety : **Isd 25**

Morphological characters of the variety

❖ Plant habit	:	Erect
❖ Tillering habit	:	Spreading
❖ Tops	:	Light
❖ Leaf carriage	:	Open
❖ Trashiness	:	Intermediate
❖ Leaf blade texture	:	Smooth
❖ Leaf Erectness	:	Curved near tip
❖ Leaf sheath waxiness	:	Medium
❖ Presence of prickles/trichomes	:	Absent
❖ Prickle/trichome quality	:	Absent
❖ Persistence of prickles/trichomes	:	Absent
❖ Outer auricle shape	:	Dentoid
❖ Inner auricle shape	:	Dentoid
❖ Dewlap waxiness	:	Absent
❖ Dewlap shape	:	Tall, triangular with convex upper and lower margins
❖ Ligule shape	:	Crescent with lozenge
❖ Stripes on cane	:	Absent
❖ Splits/growth cracks	:	Absent
❖ Corky cracks	:	Absent
❖ Corky patch	:	Absent
❖ Internode shape	:	Cylindrical
❖ Alignment	:	Straight
❖ Node swelling	:	Not swollen
❖ Growth ring width	:	Narrow
❖ Number of root primordia	:	Two rows
❖ Leaf scar prominence	:	Prominent
❖ Root band shape	:	Obconoidal
❖ Bud shape	:	Ovate with wings broadening toward apex
❖ Bud prominence	:	Bulging
❖ Bud groove/furrow expression	:	Absent
❖ Bud tip position	:	Above growth ring
❖ Bud base position	:	At leaf scar
❖ Number of internodes	:	Twenty five
❖ Solidness	:	Solid

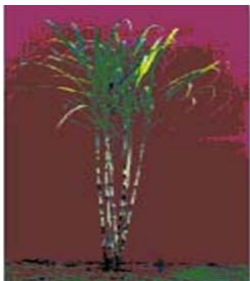


Fig: Top



Fig: Internode



Fig: Auricle

Accession No.: 16

Name of the variety : **Isd 26**

Morphological characters of the variety

❖ Plant habit	:	Intermediate
❖ Tillering habit	:	Compact
❖ Tops	:	Heavy
❖ Leaf carriage	:	Compact
❖ Trashiness	:	Intermediate
❖ Leaf blade texture	:	Smooth
❖ Leaf Erectness	:	Curved near middle
❖ Leaf sheath waxiness	:	Light
❖ Presence of prickles/trichomes	:	Few
❖ Prickle/trichome quality	:	Soft
❖ Persistence of prickles/trichomes	:	Deciduous
❖ Outer auricle shape	:	Deltoid
❖ Inner auricle shape	:	Long lanceolate
❖ Dewlap waxiness	:	Light
❖ Dewlap shape	:	Triangular
❖ Ligule shape	:	Broad crescent
❖ Stripes on cane	:	Absent
❖ Splits/growth cracks	:	Absent
❖ Corky cracks	:	Absent
❖ Corky patch	:	Absent
❖ Internode shape	:	Cylindrical
❖ Alignment	:	Straight
❖ Node swelling	:	Swollen
❖ Growth ring width	:	Narrow
❖ Number of root primordia	:	Two rows
❖ Leaf scar prominence	:	Prominent
❖ Root band shape	:	Obconoidal
❖ Bud shape	:	Round with central germ pore
❖ Bud prominence	:	Bulging
❖ Bud groove/furrow expression	:	Low
❖ Bud tip position	:	On growth ring
❖ Bud base position	:	At leaf scar
❖ Number of internodes	:	Twenty seven
❖ Solidness	:	Hollow



Fig: Top

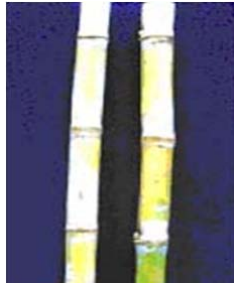


Fig: Internode



Fig: Auricle

Accession No.: 17

Name of the variety : **Isd 27**

Morphological characters of the variety

❖ Plant habit	:	Intermediate
❖ Tillering habit	:	Compact
❖ Tops	:	Light
❖ Leaf carriage	:	Compact
❖ Trashiness	:	Free
❖ Leaf blade texture	:	Smooth
❖ Leaf Erectness	:	Curved near middle
❖ Leaf sheath waxiness	:	Light
❖ Presence of prickles/trichomes	:	Absent
❖ Prickle/trichome quality	:	Absent
❖ Persistence of prickles/trichomes	:	Absent
❖ Outer auricle shape	:	Straight transitional
❖ Inner auricle shape	:	Sloping transitional
❖ Dewlap waxiness	:	Light
❖ Dewlap shape	:	Triangular
❖ Ligule shape	:	Broad crescent
❖ Stripes on cane	:	Absent
❖ Splits/growth cracks	:	Absent
❖ Corky cracks	:	Absent
❖ Corky patch	:	Absent
❖ Internode shape	:	Cylindrical
❖ Alignment	:	Straight
❖ Node swelling	:	Swollen
❖ Growth ring width	:	Narrow
❖ Number of root primordia	:	Two rows
❖ Leaf scar prominence	:	Prominent
❖ Root band shape	:	Straight
❖ Bud shape	:	Round with central germ pore
❖ Bud prominence	:	Bulging
❖ Bud groove/furrow expression	:	Medium
❖ Bud tip position	:	On growth ring
❖ Bud base position	:	At leaf scar
❖ Number of internodes	:	Twenty five
❖ Solidness	:	Solid



Fig: Top



Fig: Internode



Fig: Auricle

Accession No.: 18

Name of the variety : **Isd 28**

Morphological characters of the variety

❖ Plant habit	:	Erect
❖ Tillering habit	:	Spreading
❖ Tops	:	Heavy
❖ Leaf carriage	:	Compact
❖ Trashiness	:	Clinging
❖ Leaf blade texture	:	Smooth
❖ Leaf Erectness	:	Curved near tip
❖ Leaf sheath waxiness	:	Light
❖ Presence of prickles/trichomes	:	Absent
❖ Prickle/trichome quality	:	Absent
❖ Persistence of prickles/trichomes	:	Absent
❖ Outer auricle shape	:	Deltoid
❖ Inner auricle shape	:	Deltoid
❖ Dewlap waxiness	:	Medium
❖ Dewlap shape	:	Very sloping narrow, triangular legulate
❖ Ligule shape	:	Flat crescent
❖ Stripes on cane	:	Absent
❖ Splits/growth cracks	:	Present
❖ Corky cracks	:	Absent
❖ Corky patch	:	Absent
❖ Internode shape	:	Conoidal
❖ Alignment	:	Straight
❖ Node swelling	:	Not swollen
❖ Growth ring width	:	Narrow
❖ Number of root primordia	:	Two rows
❖ Leaf scar prominence	:	Prominent
❖ Root band shape	:	Obconoidal
❖ Bud shape	:	Simple ovate
❖ Bud prominence	:	Flat
❖ Bud groove/furrow expression	:	Absent
❖ Bud tip position	:	On growth ring
❖ Bud base position	:	At leaf scar
❖ Number of internodes	:	Twenty seven
❖ Solidness	:	Hollow



Fig: Top



Fig: Internode



Fig: Auricle

Accession No.: 19

Name of the variety : **Isd 29**

Morphological characters of the variety

❖ Plant habit	:	Erect
❖ Tillering habit	:	Spreading
❖ Tops	:	Light
❖ Leaf carriage	:	Compact
❖ Trashiness	:	Intermediate
❖ Leaf blade texture	:	Smooth
❖ Leaf Erectness	:	Curved near tip
❖ Leaf sheath waxiness	:	Heavy
❖ Presence of prickles/trichomes	:	Absent
❖ Prickle/trichome quality	:	Absent
❖ Persistence of prickles/trichomes	:	Absent
❖ Outer auricle shape	:	Deltoid
❖ Inner auricle shape	:	Dentoid
❖ Dewlap waxiness	:	Heavy
❖ Dewlap shape	:	Tall, triangular with convex upper and lower margins
❖ Ligule shape	:	Crescent with lozenge
❖ Stripes on cane	:	Absent
❖ Splits/growth cracks	:	Absent
❖ Corky cracks	:	Absent
❖ Corky patch	:	Absent
❖ Internode shape	:	Cylindrical
❖ Alignment	:	Straight
❖ Node swelling	:	Swollen
❖ Growth ring width	:	Broad
❖ Number of root primordia	:	Two rows
❖ Leaf scar prominence	:	Prominent
❖ Root band shape	:	Obconoidal
❖ Bud shape	:	Round with central germ pore
❖ Bud prominence	:	Flat
❖ Bud groove/furrow expression	:	Absent
❖ Bud tip position	:	On growth ring
❖ Bud base position	:	At leaf scar
❖ Number of internodes	:	Twenty nice
❖ Solidness	:	Solid



Fig: Top



Fig: Internode



Fig: Auricle

Accession No.: 20

Name of the variety : **Isd 30**

Morphological characters of the variety

❖ Plant habit	:	Erect
❖ Tillering habit	:	Spreading
❖ Tops	:	Heavy
❖ Leaf carriage	:	Open
❖ Trashiness	:	Free
❖ Leaf blade texture	:	Smooth
❖ Leaf Erectness	:	Curved near tip
❖ Leaf sheath waxiness	:	Light
❖ Presence of prickles/trichomes	:	Absent
❖ Prickle/trichome quality	:	Absent
❖ Persistence of prickles/trichomes	:	Absent
❖ Outer auricle shape	:	Deltoid
❖ Inner auricle shape	:	Dentoid
❖ Dewlap waxiness	:	Light
❖ Dewlap shape	:	More or less triangular, sloping with horizontal upper margins
❖ Ligule shape	:	Flat crescent
❖ Stripes on cane	:	Absent
❖ Splits/growth cracks	:	Absent
❖ Corky cracks	:	Absent
❖ Corky patch	:	Absent
❖ Internode shape	:	Cylindrical
❖ Alignment	:	Straight
❖ Node swelling	:	Not swollen
❖ Growth ring width	:	Broad
❖ Number of root primordia	:	Two rows
❖ Leaf scar prominence	:	Prominent
❖ Root band shape	:	Obconoidal
❖ Bud shape	:	Round with wings
❖ Bud prominence	:	Flat
❖ Bud groove/furrow expression	:	Absent
❖ Bud tip position	:	On growth ring
❖ Bud base position	:	At leaf scar
❖ Number of internodes	:	Twenty eight
❖ Solidness	:	Hollow



Fig: Top



Fig: Internode



Fig: Auricle

Accession No.: 21

Name of the variety : **Isd 31**

Morphological characters of the variety

❖ Plant habit	:	Erect
❖ Tillering habit	:	Spreading
❖ Tops	:	Light
❖ Leaf carriage	:	Compact
❖ Trashiness	:	Free
❖ Leaf blade texture	:	Smooth
❖ Leaf Erectness	:	Curved near tip
❖ Leaf sheath waxiness	:	Medium
❖ Presence of prickles/trichomes	:	Absent
❖ Prickle/trichome quality	:	Absent
❖ Persistence of prickles/trichomes	:	Absent
❖ Outer auricle shape	:	Straight transitional
❖ Inner auricle shape	:	Dentoid
❖ Dewlap waxiness	:	Medium
❖ Dewlap shape	:	Squarish narrow and practically horizontal
❖ Ligule shape	:	Crescent with lozenge
❖ Stripes on cane	:	Absent
❖ Splits/growth cracks	:	Absent
❖ Corky cracks	:	Absent
❖ Corky patch	:	Absent
❖ Internode shape	:	Cylindrical
❖ Alignment	:	Straight
❖ Node swelling	:	Not swollen
❖ Growth ring width	:	Narrow
❖ Number of root primordia	:	Three rows
❖ Leaf scar prominence	:	Prominent
❖ Root band shape	:	Obconoidal
❖ Bud shape	:	Roundish with wing
❖ Bud prominence	:	Bulging
❖ Bud groove/furrow expression	:	Absent
❖ Bud tip position	:	Above growth ring
❖ Bud base position	:	At leaf scar
❖ Number of internodes	:	Twenty Seven
❖ Solidness	:	Solid



Fig: Top



Fig: Internode



Fig: Auricle

Accession No.: 22

Name of the variety : **Isd 32**

Morphological characters of the variety

❖ Plant habit	:	Intermediate
❖ Tillering habit	:	Compact
❖ Tops	:	Heavy
❖ Leaf carriage	:	Compact
❖ Trashiness	:	Intermediate
❖ Leaf blade texture	:	Smooth
❖ Leaf Erectness	:	Curved near middle
❖ Leaf sheath waxiness	:	Light
❖ Presence of prickles/trichomes	:	Few
❖ Prickle/trichome quality	:	Soft
❖ Persistence of prickles/trichomes	:	Deciduous
❖ Outer auricle shape	:	Dentoid
❖ Inner auricle shape	:	Dentoid
❖ Dewlap waxiness	:	Light
❖ Dewlap shape	:	Triangular
❖ Ligule shape	:	Broad crescent
❖ Stripes on cane	:	Absent
❖ Splits/growth cracks	:	Absent
❖ Corky cracks	:	Present
❖ Corky patch	:	Absent
❖ Internode shape	:	Conoidal
❖ Alignment	:	Straight
❖ Node swelling	:	Swollen
❖ Growth ring width	:	Narrow
❖ Number of root primordia	:	Two rows
❖ Leaf scar prominence	:	Prominent
❖ Root band shape	:	Obconoidal
❖ Bud shape	:	Simple ovate
❖ Bud prominence	:	Bulging
❖ Bud groove/furrow expression	:	Absent
❖ Bud tip position	:	On growth ring
❖ Bud base position	:	At leaf scar
❖ Number of internodes	:	Twenty eight
❖ Solidness	:	Hollow



Fig: Top



Fig: Internode



Fig: Auricle

Accession No.: 23

Name of the variety : **Isd 33**

Morphological characters of the variety

❖ Plant habit	:	Erect
❖ Tillering habit	:	Spreading
❖ Tops	:	Light
❖ Leaf carriage	:	Compact
❖ Trashiness	:	Clinging
❖ Leaf blade texture	:	Smooth
❖ Leaf Erectness	:	Curved near tip
❖ Leaf sheath waxiness	:	Heavy
❖ Presence of prickles/trichomes	:	Many
❖ Prickle/trichome quality	:	Hard
❖ Persistence of prickles/trichomes	:	Non-deciduous
❖ Outer auricle shape	:	Straight transitional
❖ Inner auricle shape	:	Straight transitional
❖ Dewlap waxiness	:	Heavy
❖ Dewlap shape	:	More or less triangular, sloping with Horizontal upper margins
❖ Ligule shape	:	Crescent with lozenge
❖ Stripes on cane	:	Absent
❖ Splits/growth cracks	:	Absent
❖ Corky cracks	:	Absent
❖ Corky patch	:	Absent
❖ Internode shape	:	Cylindrical
❖ Alignment	:	Straight
❖ Node swelling	:	Swollen
❖ Growth ring width	:	Narrow
❖ Number of root primordia	:	Three rows
❖ Leaf scar prominence	:	Prominent
❖ Root band shape	:	Obconoidal
❖ Bud shape	:	Simple ovate
❖ Bud prominence	:	Bulging
❖ Bud groove/furrow expression	:	Absent
❖ Bud tip position	:	Above growth ring
❖ Bud base position	:	At leaf scar
❖ Number of internodes	:	Twenty eight
❖ Solidness	:	Hollow



Fig: Top



Fig: Internode

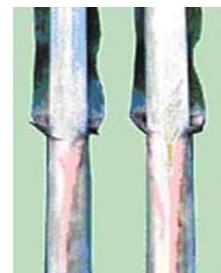


Fig: Auricle

Accession No.: 24

Name of the variety : **Isd 34**

Morphological characters of the variety

❖ Plant habit	:	Intermediate
❖ Tillering habit	:	Compact
❖ Tops	:	Light
❖ Leaf carriage	:	Compact
❖ Trashiness	:	Intermediate
❖ Leaf blade texture	:	Smooth
❖ Leaf Erectness	:	Curved near middle
❖ Leaf sheath waxiness	:	Light
❖ Presence of prickles/trichomes	:	Absent
❖ Prickle/trichome quality	:	Absent
❖ Persistence of prickles/trichomes	:	Absent
❖ Outer auricle shape	:	Deltoid
❖ Inner auricle shape	:	Deltoid
❖ Dewlap waxiness	:	Light
❖ Dewlap shape	:	Triangular
❖ Ligule shape	:	Broad crescent
❖ Stripes on cane	:	Absent
❖ Splits/growth cracks	:	Absent
❖ Corky cracks	:	Absent
❖ Corky patch	:	Absent
❖ Internode shape	:	Bobbin
❖ Alignment	:	Straight
❖ Node swelling	:	Swollen
❖ Growth ring width	:	Narrow
❖ Number of root primordia	:	Two rows
❖ Leaf scar prominence	:	Prominent
❖ Root band shape	:	Obconoidal
❖ Bud shape	:	Ovate with emarginated wings
❖ Bud prominence	:	Bulging
❖ Bud groove/furrow expression	:	Low
❖ Bud tip position	:	On growth ring
❖ Bud base position	:	At leaf scar
❖ Number of internodes	:	Twenty four
❖ Solidness	:	Pithy



Fig: Top



Fig: Internode



Fig: Auricle

Accession No.: 25

Name of the variety : **Isd 35**

Morphological characters of the variety

❖ Plant habit	:	Erect
❖ Tillering habit	:	Spreading
❖ Tops	:	Light
❖ Leaf carriage	:	Compact
❖ Trashiness	:	Free
❖ Leaf blade texture	:	Smooth
❖ Leaf Erectness	:	Curved near tip
❖ Leaf sheath waxiness	:	Light
❖ Presence of prickles/trichomes	:	Absent
❖ Prickle/trichome quality	:	Absent
❖ Persistence of prickles/trichomes	:	Absent
❖ Outer auricle shape	:	Dentoid
❖ Inner auricle shape	:	Deltoid
❖ Dewlap waxiness	:	Medium
❖ Dewlap shape	:	More or less triangular, sloping with horizontal upper margins
❖ Ligule shape	:	Crescent with lozenge
❖ Stripes on cane	:	Absent
❖ Splits/growth cracks	:	Absent
❖ Corky cracks	:	Absent
❖ Corky patch	:	Absent
❖ Internode shape	:	Obconoidal
❖ Alignment	:	Straight
❖ Node swelling	:	Not swollen
❖ Growth ring width	:	Narrow
❖ Number of root primordia	:	Two rows
❖ Leaf scar prominence	:	Prominent
❖ Root band shape	:	Obconoidal
❖ Bud shape	:	Ovate with emarginated wings
❖ Bud prominence	:	Bulging
❖ Bud groove/furrow expression	:	Absent
❖ Bud tip position	:	Above growth ring
❖ Bud base position	:	At leaf scar
❖ Number of internodes	:	Twenty nine
❖ Solidness	:	Solid



Fig: Top



Fig: Internode



Fig: Auricle

Accession No.: 26

Name of the variety : **Isd 36**

Morphological characters of the variety

❖ Plant habit	:	Intermediate
❖ Tillering habit	:	Compact
❖ Tops	:	Light
❖ Leaf carriage	:	Compact
❖ Trashiness	:	Intermediate
❖ Leaf blade texture	:	Smooth
❖ Leaf Erectness	:	Curved near middle
❖ Leaf sheath waxiness	:	Light
❖ Presence of prickles/trichomes	:	Absent
❖ Prickle/trichome quality	:	Absent
❖ Persistence of prickles/trichomes	:	Absent
❖ Outer auricle shape	:	Short lanceolate
❖ Inner auricle shape	:	Deltoid
❖ Dewlap waxiness	:	Light
❖ Dewlap shape	:	Triangular
❖ Ligule shape	:	Broad crescent
❖ Stripes on cane	:	Absent
❖ Splits/growth cracks	:	Absent
❖ Corky cracks	:	Absent
❖ Corky patch	:	Absent
❖ Internode shape	:	Bobbin
❖ Alignment	:	Straight
❖ Node swelling	:	Swollen
❖ Growth ring width	:	Narrow
❖ Number of root primordia	:	Two rows
❖ Leaf scar prominence	:	Prominent
❖ Root band shape	:	Obconoidal
❖ Bud shape	:	Simple ovate
❖ Bud prominence	:	Bulging
❖ Bud groove/furrow expression	:	Absent
❖ Bud tip position	:	On growth ring
❖ Bud base position	:	At leaf scar
❖ Number of internodes	:	Twenty six
❖ Solidness	:	Hollow



Fig: Top



Fig: Internode



Fig: Auricle

Accession No.: 27

Name of the variety : **Isd 37**

Morphological characters of the variety

❖ Plant habit	:	Intermediate
❖ Tillering habit	:	Compact
❖ Tops	:	Heavy
❖ Leaf carriage	:	Compact
❖ Trashiness	:	Intermediate
❖ Leaf blade texture	:	Smooth
❖ Leaf Erectness	:	Curved near middle
❖ Leaf sheath waxiness	:	Light
❖ Presence of prickles/trichomes	:	Absent
❖ Prickle/trichome quality	:	Absent
❖ Persistence of prickles/trichomes	:	Absent
❖ Outer auricle shape	:	Straight transitional
❖ Inner auricle shape	:	Sloping transitional
❖ Dewlap waxiness	:	Light
❖ Dewlap shape	:	Triangular
❖ Ligule shape	:	Broad crescent
❖ Stripes on cane	:	Absent
❖ Splits/growth cracks	:	Absent
❖ Corky cracks	:	Absent
❖ Corky patch	:	Absent
❖ Internode shape	:	Cylindrical
❖ Alignment	:	Straight
❖ Node swelling	:	Swollen
❖ Growth ring width	:	Narrow
❖ Number of root primordia	:	Two rows
❖ Leaf scar prominence	:	Prominent
❖ Root band shape	:	Straight
❖ Bud shape	:	Roundish with wings
❖ Bud prominence	:	Bulging
❖ Bud groove/furrow expression	:	Absent
❖ Bud tip position	:	On growth ring
❖ Bud base position	:	At leaf scar
❖ Number of internodes	:	Twenty nine
❖ Solidness	:	Hollow



Fig: Top



Fig: Internode



Fig: Auricle

Accession No.: 28

Name of the variety : **Isd 38**

Morphological characters of the variety

❖ Plant habit	:	Intermediate
❖ Tillering habit	:	Compact
❖ Tops	:	Heavy
❖ Leaf carriage	:	Compact
❖ Trashiness	:	Intermediate
❖ Leaf blade texture	:	Smooth
❖ Leaf Erectness	:	Curved near middle
❖ Leaf sheath waxiness	:	Light
❖ Presence of prickles/trichomes	:	Few
❖ Prickle/trichome quality	:	Soft
❖ Persistence of prickles/trichomes	:	Non-deciduous
❖ Outer auricle shape	:	Straight transitional
❖ Inner auricle shape	:	Dentoid
❖ Dewlap waxiness	:	Light
❖ Dewlap shape	:	Triangular
❖ Ligule shape	:	Broad crescent
❖ Stripes on cane	:	Absent
❖ Splits/growth cracks	:	Absent
❖ Corky cracks	:	Absent
❖ Corky patch	:	Absent
❖ Internode shape	:	Conoidal
❖ Alignment	:	Straight
❖ Node swelling	:	Not swollen
❖ Growth ring width	:	Narrow
❖ Number of root primordia	:	Two rows
❖ Leaf scar prominence	:	Prominent
❖ Root band shape	:	Straight
❖ Bud shape	:	Simple ovate
❖ Bud prominence	:	Bulging
❖ Bud groove/furrow expression	:	Absent
❖ Bud tip position	:	On growth ring
❖ Bud base position	:	At leaf scar
❖ Number of internodes	:	Twenty eight
❖ Solidness	:	Solid



Fig: Top



Fig: Internode



Fig: Auricle

Accession No.: 29

Name of the variety : **Isd 39**

Morphological characters of the variety

❖ Plant habit	:	Intermediate
❖ Tillering habit	:	Compact
❖ Tops	:	Light
❖ Leaf carriage	:	Compact
❖ Trashiness	:	Clinging
❖ Leaf blade texture	:	Smooth
❖ Leaf Erectness	:	Curved near middle
❖ Leaf sheath waxiness	:	Light
❖ Presence of prickles/trichomes	:	Absent
❖ Prickle/trichome quality	:	Absent
❖ Persistence of prickles/trichomes	:	Absent
❖ Outer auricle shape	:	Short lanceolate
❖ Inner auricle shape	:	Deltoid
❖ Dewlap waxiness	:	Light
❖ Dewlap shape	:	Triangular with horizontal basal margin
❖ Ligule shape	:	Broad crescent
❖ Stripes on cane	:	Absent
❖ Splits/growth cracks	:	Absent
❖ Corky cracks	:	Absent
❖ Corky patch	:	Absent
❖ Internode shape	:	Bobbin
❖ Alignment	:	Straight
❖ Node swelling	:	Swollen
❖ Growth ring width	:	Narrow
❖ Number of root primordia	:	Two rows
❖ Leaf scar prominence	:	Prominent
❖ Root band shape	:	Obconoidal
❖ Bud shape	:	Simple ovate
❖ Bud prominence	:	Bulging
❖ Bud groove/furrow expression	:	Absent
❖ Bud tip position	:	On growth ring
❖ Bud base position	:	At leaf scar
❖ Number of internodes	:	Twenty seven
❖ Solidness	:	Solid



Fig: Top



Fig: Internode



Fig: Auricle

Accession No.: 30

Name of the variety : **Isd 40**

Morphological characters of the variety

❖ Plant habit	:	Intermediate
❖ Tillering habit	:	Compact
❖ Tops	:	Light
❖ Leaf carriage	:	Compact
❖ Trashiness	:	Intermediate
❖ Leaf blade texture	:	Smooth
❖ Leaf Erectness	:	Curved near middle
❖ Leaf sheath waxiness	:	Light
❖ Presence of prickles/trichomes	:	Absent
❖ Prickle/trichome quality	:	Absent
❖ Persistence of prickles/trichomes	:	Absent
❖ Outer auricle shape	:	Straight transitional
❖ Inner auricle shape	:	Deltoid
❖ Dewlap waxiness	:	Light
❖ Dewlap shape	:	Triangular with horizontal basal margin
❖ Ligule shape	:	Broad crescent
❖ Stripes on cane	:	Absent
❖ Splits/growth cracks	:	Absent
❖ Corky cracks	:	Absent
❖ Corky patch	:	Absent
❖ Internode shape	:	Bobbin
❖ Alignment	:	Straight
❖ Node swelling	:	Swollen
❖ Growth ring width	:	Narrow
❖ Number of root primordia	:	Two rows
❖ Leaf scar prominence	:	Prominent
❖ Root band shape	:	Straight
❖ Bud shape	:	Simple ovate
❖ Bud prominence	:	Bulging
❖ Bud groove/furrow expression	:	Absent
❖ Bud tip position	:	On growth ring
❖ Bud base position	:	At leaf scar
❖ Number of internodes	:	Twenty eight
❖ Solidness	:	Solid



Fig: Top



Fig: Internode



Fig: Auricle

Accession No.: 31

Name of the variety : **Isd 41**

Morphological characters of the variety

❖ Plant habit	:	Erect
❖ Tillering habit	:	Compact
❖ Tops	:	Heavy
❖ Leaf carriage	:	Compact
❖ Trashiness	:	Free
❖ Leaf blade texture	:	Smooth
❖ Leaf erectness	:	Curved near middle
❖ Leaf sheath waxiness	:	Absent
❖ Presence of prickles/trichomes	:	Absent
❖ Prickle/trichome quality	:	Absent
❖ Persistence of prickles/trichomes	:	Absent
❖ Outer auricle shape	:	Deltoid
❖ Inner auricle shape	:	Lanceolate
❖ Dewlap waxiness	:	Light
❖ Dewlap shape	:	More or less triangular, sloping, with horizontal upper margin
❖ Ligule shape	:	Broad crescent
❖ Stripes on cane	:	Absent
❖ Splits/growth cracks	:	Absent
❖ Corky cracks	:	Absent
❖ Corky patch	:	Absent
❖ Internode shape	:	Cylindrical
❖ Alignment	:	Straight
❖ Node swelling	:	Not swollen
❖ Growth ring width	:	Broad
❖ Number of root primordia	:	Two rows
❖ Leaf scar prominence	:	Not prominent
❖ Root band shape	:	Straight
❖ Bud shape	:	Narrow ovate
❖ Bud prominence	:	Bulging
❖ Bud groove/furrow expression	:	Low
❖ Bud tip position	:	On growth ring
❖ Bud base position	:	At leaf scar
❖ Number of internodes	:	Twenty seven
❖ Solidness	:	Solid



Fig: Top



Fig: Internode



Fig: Auricle

Accession No.: 32

Name of the germplasm : **B 34-231**

Morphological characters of the germplasm

❖ Plant habit	:	Erect
❖ Tillering habit	:	Compact
❖ Tops	:	Light
❖ Leaf carriage	:	Open
❖ Trashiness	:	Free
❖ Leaf blade texture	:	Smooth
❖ Leaf erectness	:	Curved near middle
❖ Leaf sheath waxiness	:	Light
❖ Presence of prickles/trichomes	:	Few
❖ Prickle/trichome quality	:	Hard
❖ Persistence of prickles/trichomes	:	Non-deciduous
❖ Outer auricle shape	:	Straight transitional
❖ Inner auricle shape	:	Straight transitional
❖ Dewlap waxiness	:	Light
❖ Dewlap shape	:	Triangular with horizontal basal margin
❖ Ligule shape	:	Broad crescent
❖ Stripes on cane	:	Absent
❖ Splits/growth cracks	:	Absent
❖ Corky cracks	:	Absent
❖ Corky patch	:	Absent
❖ Internode shape	:	Cylindrical
❖ Alignment	:	Straight
❖ Node swelling	:	Not swollen
❖ Growth ring width	:	Broad
❖ Number of root primordia	:	Two rows
❖ Leaf scar prominence	:	Not prominent
❖ Root band shape	:	Straight
❖ Bud shape	:	Pentagonal
❖ Bud prominence	:	Bulging
❖ Bud groove/furrow expression	:	Absent
❖ Bud tip position	:	On growth ring
❖ Bud base position	:	At leaf scar
❖ Number of internodes	:	Twenty two
❖ Solidness	:	Hollow



Fig: Top



Fig: Internode



Fig: Auricle

Accession No.: 33

Name of the germplasm : **BC₁**

Morphological characters of the germplasm

❖ Plant habit	:	Reclining
❖ Tillering habit	:	Spreading
❖ Tops	:	Light
❖ Leaf carriage	:	Compact
❖ Trashiness	:	Intermediate
❖ Leaf blade texture	:	Smooth
❖ Leaf erectness	:	Curved near middle
❖ Leaf sheath waxiness	:	Medium
❖ Presence of prickles/trichomes	:	Absent
❖ Prickle/trichome quality	:	Absent
❖ Persistence of prickles/trichomes	:	Absent
❖ Outer auricle shape	:	Straight transitional
❖ Inner auricle shape	:	Straight transitional
❖ Dewlap waxiness	:	Medium
❖ Dewlap shape	:	Triangular with horizontal basal margin
❖ Ligule shape	:	Broad crescent
❖ Stripes on cane	:	Absent
❖ Splits/growth cracks	:	Absent
❖ Corky cracks	:	Absent
❖ Corky patch	:	Absent
❖ Internode shape	:	Conoidal
❖ Alignment	:	Straight
❖ Node swelling	:	Not swollen
❖ Growth ring width	:	Narrow
❖ Number of root primordia	:	Two rows
❖ Leaf scar prominence	:	Not prominent
❖ Root band shape	:	Straight
❖ Bud shape	:	Tall deltoid
❖ Bud prominence	:	Flat
❖ Bud groove/furrow expression	:	Absent
❖ Bud tip position	:	On growth ring
❖ Bud base position	:	At leaf scar
❖ Number of internodes	:	Thirty three
❖ Solidness	:	Solid



Fig: Top



Fig: Internode



Fig: Auricle

Accession No.: 34

Name of the germplasm : **BO 22**

Morphological characters of the germplasm

❖ Plant habit	:	Erect
❖ Tillering habit	:	compact
❖ Tops	:	Light
❖ Leaf carriage	:	Compact
❖ Trashiness	:	Intermediate
❖ Leaf blade texture	:	Smooth
❖ Leaf erectness	:	Curved near tip
❖ Leaf sheath waxiness	:	Medium
❖ Presence of prickles/trichomes	:	Absent
❖ Prickle/trichome quality	:	Absent
❖ Persistence of prickles/trichomes	:	Absent
❖ Outer auricle shape	:	Ascending transitional
❖ Inner auricle shape	:	Straight transitional
❖ Dewlap waxiness	:	Medium
❖ Dewlap shape	:	Triangular with horizontal basal margin
❖ Ligule shape	:	Broad crescent
❖ Stripes on cane	:	Absent
❖ Splits/growth cracks	:	Absent
❖ Corky cracks	:	Absent
❖ Corky patch	:	Absent
❖ Internode shape	:	Cylindrical
❖ Alignment	:	Straight
❖ Node swelling	:	Not swollen
❖ Growth ring width	:	Broad
❖ Number of root primordia	:	Two rows
❖ Leaf scar prominence	:	Not prominent
❖ Root band shape	:	Straight
❖ Bud shape	:	Roundish with wings
❖ Bud prominence	:	Bulging
❖ Bud groove/furrow expression	:	Absent
❖ Bud tip position	:	On growth ring
❖ Bud base position	:	At leaf scar
❖ Number of internodes	:	Twenty
❖ Solidness	:	Pithy



Fig: Top



Fig: Internode



Fig: Auricle

Accession No.: 35

Name of the germplasm : **BO 43**

Morphological characters of the germplasm

❖ Plant habit	:	Intermediate
❖ Tillering habit	:	Compact
❖ Tops	:	Light
❖ Leaf carriage	:	Compact
❖ Trashiness	:	Free
❖ Leaf blade texture	:	Smooth
❖ Leaf erectness	:	Curved near middle
❖ Leaf sheath waxiness	:	Light
❖ Presence of prickles/trichomes	:	Absent
❖ Prickle/trichome quality	:	Absent
❖ Persistence of prickles/trichomes	:	Absent
❖ Outer auricle shape	:	Ascending transitional
❖ Inner auricle shape	:	Sloping transitional
❖ Dewlap waxiness	:	Light
❖ Dewlap shape	:	Triangular with horizontal basal margin
❖ Ligule shape	:	Linear crescent
❖ Stripes on cane	:	Absent
❖ Splits/growth cracks	:	Absent
❖ Corky cracks	:	Absent
❖ Corky patch	:	Absent
❖ Internode shape	:	Cylindrical
❖ Alignment	:	Straight
❖ Node swelling	:	Not swollen
❖ Growth ring width	:	Broad
❖ Number of root primordia	:	Two rows
❖ Leaf scar prominence	:	Prominent
❖ Root band shape	:	Straight
❖ Bud shape	:	Roundish with wings
❖ Bud prominence	:	Flat
❖ Bud groove/furrow expression	:	Absent
❖ Bud tip position	:	Below growth ring
❖ Bud base position	:	At leaf scar
❖ Number of internodes	:	Twenty three
❖ Solidness	:	Hollow



Fig: Top



Fig: Internode



Fig: Auricle

Accession No.: 36

Name of the germplasm : **CL 41-229**

Morphological characters of the germplasm

❖ Plant habit	:	Erect
❖ Tillering habit	:	Compact
❖ Tops	:	Light
❖ Leaf carriage	:	Open
❖ Trashiness	:	Clinging
❖ Leaf blade texture	:	Smooth
❖ Leaf erectness	:	Curved near middle
❖ Leaf sheath waxiness	:	Light
❖ Presence of prickles/trichomes	:	Absent
❖ Prickle/trichome quality	:	Absent
❖ Persistence of prickles/trichomes	:	Absent
❖ Outer auricle shape	:	Sloping transitional
❖ Inner auricle shape	:	Dentoid
❖ Dewlap waxiness	:	Light
❖ Dewlap shape	:	tall, triangular, with convex upper and lower margins
❖ Ligule shape	:	Crescent with lozenge
❖ Stripes on cane	:	Absent
❖ Splits/growth cracks	:	Absent
❖ Corky cracks	:	Present
❖ Corky patch	:	Absent
❖ Internode shape	:	Conoidal
❖ Alignment	:	Straight
❖ Node swelling	:	Not swollen
❖ Growth ring width	:	Broad
❖ Number of root primordia	:	Two rows
❖ Leaf scar prominence	:	Prominent
❖ Root band shape	:	Straight
❖ Bud shape	:	Ovate with emarginated wings
❖ Bud prominence	:	Flat
❖ Bud groove/furrow expression	:	Absent
❖ Bud tip position	:	Below growth ring
❖ Bud base position	:	At leaf scar
❖ Number of internodes	:	Twenty nine
❖ Solidness	:	Pithy



Fig: Top



Fig: Internode



Fig: Auricle

Accession No.:37

Name of the germplasm : **CC 630**

Morphological characters of the germplasm

❖ Plant habit	:	Intermediate
❖ Tillering habit	:	Compact
❖ Tops	:	Light
❖ Leaf carriage	:	Compact
❖ Trashiness	:	Clinging
❖ Leaf blade texture	:	Smooth
❖ Leaf erectness	:	Curved near middle
❖ Leaf sheath waxiness	:	Light
❖ Presence of prickles/trichomes	:	Absent
❖ Prickle/trichome quality	:	Absent
❖ Persistence of prickles/trichomes	:	Absent
❖ Outer auricle shape	:	Straight transitional
❖ Inner auricle shape	:	Straight transitional
❖ Dewlap waxiness	:	Light
❖ Dewlap shape	:	More or less triangular, sloping, with horizontal upper margin
❖ Ligule shape	:	Broad subarcuate
❖ Stripes on cane	:	Absent
❖ Splits/growth cracks	:	Absent
❖ Corky cracks	:	Absent
❖ Corky patch	:	Absent
❖ Internode shape	:	Cylindrical
❖ Alignment	:	Straight
❖ Node swelling	:	Not swollen
❖ Growth ring width	:	Broad
❖ Number of root primordia	:	Irregular
❖ Leaf scar prominence	:	Prominent
❖ Root band shape	:	Straight
❖ Bud shape	:	Roundish with wings
❖ Bud prominence	:	Flat
❖ Bud groove/furrow expression	:	Absent
❖ Bud tip position	:	Below growth ring
❖ Bud base position	:	At leaf scar
❖ Number of internodes	:	Twenty five
❖ Solidness	:	Hollow



Fig: Top



Fig: Internode



Fig: Auricle

Accession No.: 38

Name of the germplasm : **CO 635**

Morphological characters of the germplasm

❖ Plant habit	:	Intermediate
❖ Tillering habit	:	Compact
❖ Tops	:	Light
❖ Leaf carriage	:	Open
❖ Trashiness	:	Clinging
❖ Leaf blade texture	:	Smooth
❖ Leaf erectness	:	Bent near tip
❖ Leaf sheath waxiness	:	Medium
❖ Presence of prickles/trichomes	:	Absent
❖ Prickle/trichome quality	:	Absent
❖ Persistence of prickles/trichomes	:	Absent
❖ Outer auricle shape	:	Straight transitional
❖ Inner auricle shape	:	Ascending transitional
❖ Dewlap waxiness	:	Medium
❖ Dewlap shape	:	Tall, triangular, with convex upper and lower margins
❖ Ligule shape	:	Crescent with lozenge
❖ Stripes on cane	:	Absent
❖ Splits/growth cracks	:	Absent
❖ Corky cracks	:	Present
❖ Corky patch	:	Absent
❖ Internode shape	:	Cylindrical
❖ Alignment	:	Straight
❖ Node swelling	:	Not swollen
❖ Growth ring width	:	Broad
❖ Number of root primordia	:	Two rows
❖ Leaf scar prominence	:	Prominent
❖ Root band shape	:	Conoidal
❖ Bud shape	:	Ovate with broadening toward apex
❖ Bud prominence	:	Bulging
❖ Bud groove/furrow expression	:	Absent
❖ Bud tip position	:	On growth ring
❖ Bud base position	:	At leaf scar
❖ Number of internodes	:	Twenty eight
❖ Solidness	:	Solid



Fig: Top



Fig: Internode



Fig: Auricle

Accession No.: 39

Name of the germplasm : **Co 642**

Morphological characters of the germplasm

❖ Plant habit	:	Erect
❖ Tillering habit	:	Compact
❖ Tops	:	Heavy
❖ Leaf carriage	:	Compact
❖ Trashiness	:	Free
❖ Leaf blade texture	:	Smooth
❖ Leaf erectness	:	Bent near tip
❖ Leaf sheath waxiness	:	Medium
❖ Presence of prickles/trichomes	:	Few
❖ Prickle/trichome quality	:	Hard
❖ Persistence of prickles/trichomes	:	Deciduous
❖ Outer auricle shape	:	Straight transitional
❖ Inner auricle shape	:	Ascending transitional
❖ Dewlap waxiness	:	Medium
❖ Dewlap shape	:	More or less triangular, sloping, with horizontal upper margin
❖ Ligule shape	:	Linear crescent
❖ Stripes on cane	:	Absent
❖ Splits/growth cracks	:	Absent
❖ Corky cracks	:	Absent
❖ Corky patch	:	Absent
❖ Internode shape	:	Cylindrical
❖ Alignment	:	Straight
❖ Node swelling	:	Swollen
❖ Growth ring width	:	Broad
❖ Number of root primordia	:	Two rows
❖ Leaf scar prominence	:	Prominent
❖ Root band shape	:	Straight
❖ Bud shape	:	Pentagonal
❖ Bud prominence	:	Bulging
❖ Bud groove/furrow expression	:	Absent
❖ Bud tip position	:	Below growth ring
❖ Bud base position	:	At leaf scar
❖ Number of internodes	:	Thirty three
❖ Solidness	:	Pithy



Fig: Top



Fig: Internode



Fig: Auricle

Accession No.: 40

Name of the germplasm : **CoL 29**

Morphological characters of the germplasm

❖ Plant habit	:	Erect
❖ Tillering habit	:	Compact
❖ Tops	:	Heavy
❖ Leaf carriage	:	Compact
❖ Trashiness	:	Intermediate
❖ Leaf blade texture	:	Smooth
❖ Leaf erectness	:	Bent near tip
❖ Leaf sheath waxiness	:	Light
❖ Presence of prickles/trichomes	:	Absent
❖ Prickle/trichome quality	:	Absent
❖ Persistence of prickles/trichomes	:	Absent
❖ Outer auricle shape	:	Deltoid
❖ Inner auricle shape	:	Deltoid
❖ Dewlap waxiness	:	Light
❖ Dewlap shape	:	More or less triangular, sloping, with horizontal upper margin
❖ Ligule shape	:	Crescent with lozenge
❖ Stripes on cane	:	Absent
❖ Splits/growth cracks	:	Absent
❖ Corky cracks	:	Absent
❖ Corky patch	:	Absent
❖ Internode shape	:	Cylindrical
❖ Alignment	:	Straight
❖ Node swelling	:	Not swollen
❖ Growth ring width	:	Broad
❖ Number of root primordia	:	Two rows
❖ Leaf scar prominence	:	Not prominent
❖ Root band shape	:	Straight
❖ Bud shape	:	Simple ovate
❖ Bud prominence	:	Bulging
❖ Bud groove/furrow expression	:	Low
❖ Bud tip position	:	Above growth ring
❖ Bud base position	:	At leaf scar
❖ Number of internodes	:	Twenty four
❖ Solidness	:	Pithy



Fig: Top



Fig: Internode



Fig: Auricle

Accession No.: 41

Name of the germplasm : **CP 61-37**

Morphological characters of the germplasm

❖ Plant habit	:	Intermediate
❖ Tillering habit	:	Compact
❖ Tops	:	Light
❖ Leaf carriage	:	Compact
❖ Trashiness	:	Intermediate
❖ Leaf blade texture	:	Smooth
❖ Leaf erectness	:	Curved near middle
❖ Leaf sheath waxiness	:	Light
❖ Presence of prickles/trichomes	:	Absent
❖ Prickle/trichome quality	:	Absent
❖ Persistence of prickles/trichomes	:	Absent
❖ Outer auricle shape	:	Sloping transitional
❖ Inner auricle shape	:	Sloping transitional
❖ Dewlap waxiness	:	Light
❖ Dewlap shape	:	Triangular with horizontal basal margin
❖ Ligule shape	:	Broad crescent
❖ Stripes on cane	:	Absent
❖ Splits/growth cracks	:	Absent
❖ Corky cracks	:	Absent
❖ Corky patch	:	Absent
❖ Internode shape	:	Conoidal
❖ Alignment	:	Straight
❖ Node swelling	:	Not swollen
❖ Growth ring width	:	Narrow
❖ Number of root primordia	:	Two rows
❖ Leaf scar prominence	:	Not prominent
❖ Root band shape	:	Straight
❖ Bud shape	:	Pentagonal
❖ Bud prominence	:	Flat
❖ Bud groove/furrow expression	:	Absent
❖ Bud tip position	:	On growth ring
❖ Bud base position	:	At leaf scar
❖ Number of internodes	:	Twenty nine
❖ Solidness	:	Hollow



Fig: Top



Fig: Internode



Fig: Auricle

Accession No.: 42

Name of the germplasm : **CP 75-361**

Morphological characters of the germplasm

❖ Plant habit	:	Intermediate
❖ Tillering habit	:	Compact
❖ Tops	:	Light
❖ Leaf carriage	:	Open
❖ Trashiness	:	Free
❖ Leaf blade texture	:	Smooth
❖ Leaf erectness	:	Curved near tip
❖ Leaf sheath waxiness	:	Medium
❖ Presence of prickles/trichomes	:	Absent
❖ Prickle/trichome quality	:	Absent
❖ Persistence of prickles/trichomes	:	Absent
❖ Outer auricle shape	:	Long lanceolate
❖ Inner auricle shape	:	Straight transitional
❖ Dewlap waxiness	:	Medium
❖ Dewlap shape	:	Tall, triangular, with convex upper and lower margins
❖ Ligule shape	:	Crescent with lozenge
❖ Stripes on cane	:	Absent
❖ Splits/growth cracks	:	Absent
❖ Corky cracks	:	Present
❖ Corky patch	:	Present
❖ Internode shape	:	Conoidal
❖ Alignment	:	Zigzag
❖ Node swelling	:	Swollen
❖ Growth ring width	:	Broad
❖ Number of root primordia	:	One row
❖ Leaf scar prominence	:	Prominent
❖ Root band shape	:	Straight
❖ Bud shape	:	Pentagonal
❖ Bud prominence	:	Bulging
❖ Bud groove/furrow expression	:	Medium
❖ Bud tip position	:	Below growth ring
❖ Bud base position	:	Above leaf scar
❖ Number of internodes	:	Thirty two
❖ Solidness	:	Solid



Fig: Top



Fig: Internode



Fig: Auricle

Accession No.: 43

Name of the germplasm : **CP 69-1052**

Morphological characters of the germplasm

❖ Plant habit	:	Erect
❖ Tillering habit	:	Compact
❖ Tops	:	Light
❖ Leaf carriage	:	Compact
❖ Trashiness	:	Free
❖ Leaf blade texture	:	Smooth
❖ Leaf erectness	:	Curved near middle
❖ Leaf sheath waxiness	:	Light
❖ Presence of prickles/trichomes	:	Few
❖ Prickle/trichome quality	:	Soft
❖ Persistence of prickles/trichomes	:	Deciduous
❖ Outer auricle shape	:	Deltoid
❖ Inner auricle shape	:	Long lanceolate
❖ Dewlap waxiness	:	Light
❖ Dewlap shape	:	Typical ligulate, very narrow and practically horizontal
❖ Ligule shape	:	Linear crescent
❖ Stripes on cane	:	Absent
❖ Splits/growth cracks	:	Absent
❖ Corky cracks	:	Absent
❖ Corky patch	:	Absent
❖ Internode shape	:	Cylindrical
❖ Alignment	:	Straight
❖ Node swelling	:	Not swollen
❖ Growth ring width	:	Broad
❖ Number of root primordia	:	Two rows
❖ Leaf scar prominence	:	Prominent
❖ Root band shape	:	Straight
❖ Bud shape	:	Ovate with secondary wings
❖ Bud prominence	:	Flat
❖ Bud groove/furrow expression	:	Absent
❖ Bud tip position	:	Below growth ring
❖ Bud base position	:	Above leaf scar
❖ Number of internodes	:	Thirty two
❖ Solidness	:	Hollow



Fig: Top



Fig: Internode



Fig: Auricle

Accession No.: 44

Name of the germplasm : **CPI 96-80**

Morphological characters of the germplasm

❖ Plant habit	:	Erect
❖ Tillering habit	:	Compact
❖ Tops	:	Light
❖ Leaf carriage	:	Compact
❖ Trashiness	:	Intermediate
❖ Leaf blade texture	:	Smooth
❖ Leaf erectness	:	Curved near tip
❖ Leaf sheath waxiness	:	Light
❖ Presence of prickles/trichomes	:	Absent
❖ Prickle/trichome quality	:	Absent
❖ Persistence of prickles/trichomes	:	Absent
❖ Outer auricle shape	:	Ascending transitional
❖ Inner auricle shape	:	Deltoid
❖ Dewlap waxiness	:	Light
❖ Dewlap shape	:	Tall, triangular, with convex upper and lower margins
❖ Ligule shape	:	Crescent with lozenge
❖ Stripes on cane	:	Absent
❖ Splits/growth cracks	:	Absent
❖ Corky cracks	:	Absent
❖ Corky patch	:	Absent
❖ Internode shape	:	Cylindrical
❖ Alignment	:	Straight
❖ Node swelling	:	Not swollen
❖ Growth ring width	:	Broad
❖ Number of root primordia	:	Two rows
❖ Leaf scar prominence	:	Prominent
❖ Root band shape	:	Straight
❖ Bud shape	:	Round with central germ pore
❖ Bud prominence	:	Flat
❖ Bud groove/furrow expression	:	Absent
❖ Bud tip position	:	Below growth ring
❖ Bud base position	:	Above leaf scar
❖ Number of internodes	:	Twenty five
❖ Solidness	:	Solid



Fig: Top



Fig: Internode



Fig: Auricle

Accession No.: 45

Name of the germplasm : **CP 36-105**

Morphological characters of the germplasm

❖ Plant habit	:	Intermediate
❖ Tillering habit	:	Compact
❖ Tops	:	Light
❖ Leaf carriage	:	Compact
❖ Trashiness	:	Free
❖ Leaf blade texture	:	Smooth
❖ Leaf erectness	:	Curved near tip
❖ Leaf sheath waxiness	:	Light
❖ Presence of prickles/trichomes	:	Absent
❖ Prickle/trichome quality	:	Absent
❖ Persistence of prickles/trichomes	:	Absent
❖ Outer auricle shape	:	Sloping transitional
❖ Inner auricle shape	:	Ascending transitional
❖ Dewlap waxiness	:	Light
❖ Dewlap shape	:	More or less triangular, sloping, with horizontal upper margin
❖ Ligule shape	:	Linear crescent
❖ Stripes on cane	:	Absent
❖ Splits/growth cracks	:	Absent
❖ Corky cracks	:	Present
❖ Corky patch	:	Absent
❖ Internode shape	:	Cylindrical
❖ Alignment	:	Straight
❖ Node swelling	:	Not swollen
❖ Growth ring width	:	Broad
❖ Number of root primordia	:	Two rows
❖ Leaf scar prominence	:	Prominent
❖ Root band shape	:	Straight
❖ Bud shape	:	Round with central germ pore
❖ Bud prominence	:	Bulging
❖ Bud groove/furrow expression	:	Absent
❖ Bud tip position	:	Below growth ring
❖ Bud base position	:	Above leaf scar
❖ Number of internodes	:	Twenty seven
❖ Solidness	:	Solid



Fig: Top



Fig: Internode



Fig: Auricle

Accession No.: 46

Name of the germplasm : **CP 53-33**

Morphological characters of the germplasm

❖ Plant habit	:	Erect
❖ Tillering habit	:	Compact
❖ Tops	:	Light
❖ Leaf carriage	:	Compact
❖ Trashiness	:	Intermediate
❖ Leaf blade texture	:	Smooth
❖ Leaf erectness	:	Curved near middle
❖ Leaf sheath waxiness	:	Medium
❖ Presence of prickles/trichomes	:	Absent
❖ Prickle/trichome quality	:	Absent
❖ Persistence of prickles/trichomes	:	Absent
❖ Outer auricle shape	:	Straight transitional
❖ Inner auricle shape	:	Straight transitional
❖ Dewlap waxiness	:	Medium
❖ Dewlap shape	:	Triangular with horizontal basal margin
❖ Ligule shape	:	Broad crescent
❖ Stripes on cane	:	Absent
❖ Splits/growth cracks	:	Absent
❖ Corky cracks	:	Absent
❖ Corky patch	:	Absent
❖ Internode shape	:	Cylindrical
❖ Alignment	:	Straight
❖ Node swelling	:	Not swollen
❖ Growth ring width	:	Narrow
❖ Number of root primordia	:	Two rows
❖ Leaf scar prominence	:	Not prominent
❖ Root band shape	:	Straight
❖ Bud shape	:	Squat rhomboid
❖ Bud prominence	:	Flat
❖ Bud groove/furrow expression	:	Low
❖ Bud tip position	:	On growth ring
❖ Bud base position	:	At leaf scar
❖ Number of internodes	:	Thirty
❖ Solidness	:	Pithy



Fig: Top



Fig: Internode



Fig: Auricle

Accession No.: 47

Name of the germplasm : **CP 44-101**

Morphological characters of the germplasm

❖ Plant habit	:	Intermediate
❖ Tillering habit	:	Compact
❖ Tops	:	Light
❖ Leaf carriage	:	Compact
❖ Trashiness	:	Intermediate
❖ Leaf blade texture	:	Smooth
❖ Leaf erectness	:	Curved near middle
❖ Leaf sheath waxiness	:	Medium
❖ Presence of prickles/trichomes	:	Absent
❖ Prickle/trichome quality	:	Absent
❖ Persistence of prickles/trichomes	:	Absent
❖ Outer auricle shape	:	Sloping transitional
❖ Inner auricle shape	:	Straight transitional
❖ Dewlap waxiness	:	Medium
❖ Dewlap shape	:	More or less triangular, sloping, with horizontal upper margin
❖ Ligule shape	:	Deltoid
❖ Stripes on cane	:	Absent
❖ Splits/growth cracks	:	Present
❖ Corky cracks	:	Absent
❖ Corky patch	:	Absent
❖ Internode shape	:	Barrel-shaped
❖ Alignment	:	Straight
❖ Node swelling	:	Not swollen
❖ Growth ring width	:	Narrow
❖ Number of root primordia	:	Two rows
❖ Leaf scar prominence	:	Not prominent
❖ Root band shape	:	Straight
❖ Bud shape	:	Roundish with wings
❖ Bud prominence	:	Bulging
❖ Bud groove/furrow expression	:	Absent
❖ Bud tip position	:	On growth ring
❖ Bud base position	:	At leaf scar
❖ Number of internodes	:	Twenty four
❖ Solidness	:	Solid



Fig: Top



Fig: Internode



Fig: Auricle

Accession No.: 48

Name of the germplasm : **CP 75-361**

Morphological characters of the germplasm

❖ Plant habit	:	Erect
❖ Tillering habit	:	Compact
❖ Tops	:	Light
❖ Leaf carriage	:	Compact
❖ Trashiness	:	Intermediate
❖ Leaf blade texture	:	Smooth
❖ Leaf erectness	:	Curved near middle
❖ Leaf sheath waxiness	:	Medium
❖ Presence of prickles/trichomes	:	Absent
❖ Prickle/trichome quality	:	Absent
❖ Persistence of prickles/trichomes	:	Absent
❖ Outer auricle shape	:	Sloping transitional
❖ Inner auricle shape	:	Sloping transitional
❖ Dewlap waxiness	:	Medium
❖ Dewlap shape	:	Triangular with horizontal basal margin
❖ Ligule shape	:	Broad crescent
❖ Stripes on cane	:	Absent
❖ Splits/growth cracks	:	Absent
❖ Corky cracks	:	Absent
❖ Corky patch	:	Absent
❖ Internode shape	:	Cylindrical
❖ Alignment	:	Straight
❖ Node swelling	:	Not swollen
❖ Growth ring width	:	Narrow
❖ Number of root primordia	:	Two rows
❖ Leaf scar prominence	:	Not prominent
❖ Root band shape	:	Straight
❖ Bud shape	:	Simple ovate
❖ Bud prominence	:	Flat
❖ Bud groove/furrow expression	:	Absent
❖ Bud tip position	:	On growth ring
❖ Bud base position	:	At leaf scar
❖ Number of internodes	:	Twenty two
❖ Solidness	:	Hollow



Fig: Top



Fig: Internode



Fig: Auricle

Accession No.: 49

Name of the germplasm : **CP 70-1133**

Morphological characters of the germplasm

❖ Plant habit	:	Intermediate
❖ Tillering habit	:	Compact
❖ Tops	:	Heavy
❖ Leaf carriage	:	Open
❖ Trashiness	:	Intermediate
❖ Leaf blade texture	:	Smooth
❖ Leaf erectness	:	Erect to tip
❖ Leaf sheath waxiness	:	Light
❖ Presence of prickles/trichomes	:	Few
❖ Prickle/trichome quality	:	Hard
❖ Persistence of prickles/trichomes	:	Deciduous
❖ Outer auricle shape	:	Straight transitional
❖ Inner auricle shape	:	Ascending transitional
❖ Dewlap waxiness	:	Light
❖ Dewlap shape	:	More or less triangular, sloping with horizontal upper margin
❖ Ligule shape	:	Deltoid
❖ Stripes on cane	:	Absent
❖ Splits/growth cracks	:	Absent
❖ Corky cracks	:	Absent
❖ Corky patch	:	Absent
❖ Internode shape	:	Conoidal
❖ Alignment	:	Straight
❖ Node swelling	:	Not swollen
❖ Growth ring width	:	Broad
❖ Number of root primordia	:	Three rows
❖ Leaf scar prominence	:	Not prominent
❖ Root band shape	:	Straight
❖ Bud shape	:	Simple ovate
❖ Bud prominence	:	Bulging
❖ Bud groove/furrow expression	:	Absent
❖ Bud tip position	:	On growth ring
❖ Bud base position	:	At leaf scar
❖ Number of internodes	:	Twenty four
❖ Solidness	:	Solid



Fig: Top



Fig: Internode



Fig: Auricle

Accession No.: 50

Name of the germplasm : **I 101-66**

Morphological characters of the germplasm

❖ Plant habit	:	Erect
❖ Tillering habit	:	Compact
❖ Tops	:	Light
❖ Leaf carriage	:	Compact
❖ Trashiness	:	Intermediate
❖ Leaf blade texture	:	Smooth
❖ Leaf erectness	:	Erect to tip
❖ Leaf sheath waxiness	:	Light
❖ Presence of prickles/trichomes	:	Absent
❖ Prickle/trichome quality	:	Absent
❖ Persistence of prickles/trichomes	:	Absent
❖ Outer auricle shape	:	Sloping transitional
❖ Inner auricle shape	:	Sloping transitional
❖ Dewlap waxiness	:	Light
❖ Dewlap shape	:	Deltoid
❖ Ligule shape	:	Broad crescent
❖ Stripes on cane	:	Absent
❖ Splits/growth cracks	:	Absent
❖ Corky cracks	:	Absent
❖ Corky patch	:	Absent
❖ Internode shape	:	Conoidal
❖ Alignment	:	Straight
❖ Node swelling	:	Not swollen
❖ Growth ring width	:	Narrow
❖ Number of root primordia	:	Two rows
❖ Leaf scar prominence	:	Not prominent
❖ Root band shape	:	Straight
❖ Bud shape	:	Simple ovate
❖ Bud prominence	:	Bulging
❖ Bud groove/furrow expression	:	Absent
❖ Bud tip position	:	On growth ring
❖ Bud base position	:	At leaf scar
❖ Number of internodes	:	Twenty six
❖ Solidness	:	Solid



Fig: Top



Fig: Internode



Fig: Auricle

Accession No.: 51

Name of the germplasm : **I 134-70**

Morphological characters of the germplasm

❖ Plant habit	:	Erect
❖ Tillering habit	:	Compact
❖ Tops	:	Light
❖ Leaf carriage	:	Open
❖ Trashiness	:	Free
❖ Leaf blade texture	:	Smooth
❖ Leaf erectness	:	Curved near tip
❖ Leaf sheath waxiness	:	Light
❖ Presence of prickles/trichomes	:	Absent
❖ Prickle/trichome quality	:	Absent
❖ Persistence of prickles/trichomes	:	Absent
❖ Outer auricle shape	:	Ascending transitional
❖ Inner auricle shape	:	Straight transitional
❖ Dewlap waxiness	:	Light
❖ Dewlap shape	:	More or less triangular, sloping, with horizontal upper margin
❖ Ligule shape	:	Crescent with lozenge
❖ Stripes on cane	:	Absent
❖ Splits/growth cracks	:	Absent
❖ Corky cracks	:	Absent
❖ Corky patch	:	Absent
❖ Internode shape	:	Cylindrical
❖ Alignment	:	Straight
❖ Node swelling	:	Not swollen
❖ Growth ring width	:	Broad
❖ Number of root primordia	:	Three rows
❖ Leaf scar prominence	:	Prominent
❖ Root band shape	:	Straight
❖ Bud shape	:	Round with central germ pore
❖ Bud prominence	:	Flat
❖ Bud groove/furrow expression	:	Absent
❖ Bud tip position	:	Below growth ring
❖ Bud base position	:	At leaf scar
❖ Number of internodes	:	Twenty eight
❖ Solidness	:	Hollow



Fig: Top



Fig: Internode



Fig: Auricle

Accession No.: 52

Name of the germplasm : **I 4-71**

Morphological characters of the germplasm

❖ Plant habit	:	Erect
❖ Tillering habit	:	Compact
❖ Tops	:	Light
❖ Leaf carriage	:	Compact
❖ Trashiness	:	Intermediate
❖ Leaf blade texture	:	Smooth
❖ Leaf erectness	:	Curved near middle
❖ Leaf sheath waxiness	:	Light
❖ Presence of prickles/trichomes	:	Absent
❖ Prickle/trichome quality	:	Absent
❖ Persistence of prickles/trichomes	:	Absent
❖ Outer auricle shape	:	Straight transitional
❖ Inner auricle shape	:	Straight transitional
❖ Dewlap waxiness	:	Medium
❖ Dewlap shape	:	More or less triangular, sloping, with horizontal upper margin
❖ Ligule shape	:	Broad crescent
❖ Stripes on cane	:	Absent
❖ Splits/growth cracks	:	Absent
❖ Corky cracks	:	Absent
❖ Corky patch	:	Absent
❖ Internode shape	:	Conoidal
❖ Alignment	:	Straight
❖ Node swelling	:	Not swollen
❖ Growth ring width	:	Narrow
❖ Number of root primordia	:	Two rows
❖ Leaf scar prominence	:	Not prominent
❖ Root band shape	:	Straight
❖ Bud shape	:	Squat rhomboid
❖ Bud prominence	:	Flat
❖ Bud groove/furrow expression	:	Absent
❖ Bud tip position	:	On growth ring
❖ Bud base position	:	At leaf scar
❖ Number of internodes	:	Twenty seven
❖ Solidness	:	Hollow



Fig: Top



Fig: Internode



Fig: Auricle

Accession No.: 53

Name of the germplasm : **I 33-78**

Morphological characters of the germplasm

❖ Plant habit	:	Intermediate
❖ Tillering habit	:	Compact
❖ Tops	:	Light
❖ Leaf carriage	:	Compact
❖ Trashiness	:	Intermediate
❖ Leaf blade texture	:	Smooth
❖ Leaf erectness	:	Curved near middle
❖ Leaf sheath waxiness	:	Medium
❖ Presence of prickles/trichomes	:	Absent
❖ Prickle/trichome quality	:	Absent
❖ Persistence of prickles/trichomes	:	Absent
❖ Outer auricle shape	:	Straight transitional
❖ Inner auricle shape	:	Straight transitional
❖ Dewlap waxiness	:	Medium
❖ Dewlap shape	:	Triangular with horizontal basal margin
❖ Ligule shape	:	Broad crescent
❖ Stripes on cane	:	Absent
❖ Splits/growth cracks	:	Absent
❖ Corky cracks	:	Absent
❖ Corky patch	:	Absent
❖ Internode shape	:	Cylindrical
❖ Alignment	:	Straight
❖ Node swelling	:	Not swollen
❖ Growth ring width	:	Narrow
❖ Number of root primordia	:	Two rows
❖ Leaf scar prominence	:	Prominent
❖ Root band shape	:	Straight
❖ Bud shape	:	Ovate with wing broadening toward apex
❖ Bud prominence	:	Flat
❖ Bud groove/furrow expression	:	Absent
❖ Bud tip position	:	On growth ring
❖ Bud base position	:	At leaf scar
❖ Number of internodes	:	Twenty eight
❖ Solidness	:	Solid



Fig: Top



Fig: Internode



Fig: Auricle

Accession No.: 54

Name of the germplasm : **I 68-78**

Morphological characters of the germplasm

❖ Plant habit	:	Erect
❖ Tillering habit	:	Compact
❖ Tops	:	Light
❖ Leaf carriage	:	Compact
❖ Trashiness	:	Intermediate
❖ Leaf blade texture	:	Smooth
❖ Leaf erectness	:	Curved near middle
❖ Leaf sheath waxiness	:	Medium
❖ Presence of prickles/trichomes	:	Many
❖ Prickle/trichome quality	:	Hard
❖ Persistence of prickles/trichomes	:	Non-deciduous
❖ Outer auricle shape	:	Sloping transitional
❖ Inner auricle shape	:	Sloping transitional
❖ Dewlap waxiness	:	Medium
❖ Dewlap shape	:	Triangular with horizontal basal margin
❖ Ligule shape	:	Crescent with lozenge
❖ Stripes on cane	:	Absent
❖ Splits/growth cracks	:	Absent
❖ Corky cracks	:	Absent
❖ Corky patch	:	Absent
❖ Internode shape	:	Cylindrical
❖ Alignment	:	Straight
❖ Node swelling	:	Not swollen
❖ Growth ring width	:	Broad
❖ Number of root primordia	:	Irregular
❖ Leaf scar prominence	:	Not prominent
❖ Root band shape	:	Straight
❖ Bud shape	:	Round with central germ pore
❖ Bud prominence	:	Flat
❖ Bud groove/furrow expression	:	Absent
❖ Bud tip position	:	Below growth ring
❖ Bud base position	:	At leaf scar
❖ Number of internodes	:	Twenty five
❖ Solidness	:	Solid



Fig: Top



Fig: Internode



Fig: Auricle

Accession No.: 55

Name of the germplasm : **I 91-79**

Morphological characters of the germplasm

❖ Plant habit	:	Erect
❖ Tillering habit	:	Compact
❖ Tops	:	Light
❖ Leaf carriage	:	Open
❖ Trashiness	:	Intermediate
❖ Leaf blade texture	:	Smooth
❖ Leaf erectness	:	Curved near middle
❖ Leaf sheath waxiness	:	Light
❖ Presence of prickles/trichomes	:	Absent
❖ Prickle/trichome quality	:	Absent
❖ Persistence of prickles/trichomes	:	Absent
❖ Outer auricle shape	:	Straight transitional
❖ Inner auricle shape	:	Ascending transitional
❖ Dewlap waxiness	:	Light
❖ Dewlap shape	:	Tall, triangular, with convex upper and lower margins
❖ Ligule shape	:	Crescent with lozenge
❖ Stripes on cane	:	Absent
❖ Splits/growth cracks	:	Present
❖ Corky cracks	:	Present
❖ Corky patch	:	Present
❖ Internode shape	:	Conoidal
❖ Alignment	:	Straight
❖ Node swelling	:	Swollen
❖ Growth ring width	:	Broad
❖ Number of root primordia	:	Two rows
❖ Leaf scar prominence	:	Prominent
❖ Root band shape	:	Obconoidal
❖ Bud shape	:	Pentagonal
❖ Bud prominence	:	Bulging
❖ Bud groove/furrow expression	:	Absent
❖ Bud tip position	:	Below growth ring
❖ Bud base position	:	Above leaf scar
❖ Number of internodes	:	Twenty five
❖ Solidness	:	Solid



Fig: Top



Fig: Internode



Fig: Auricle

Accession No.:56

Name of the germplasm : **I 25-80**

Morphological characters of the germplasm

❖ Plant habit	:	Erect
❖ Tillering habit	:	Compact
❖ Tops	:	Heavy
❖ Leaf carriage	:	Compact
❖ Trashiness	:	Intermediate
❖ Leaf blade texture	:	Smooth
❖ Leaf erectness	:	Curved near middle
❖ Leaf sheath waxiness	:	Light
❖ Presence of prickles/trichomes	:	Absent
❖ Prickle/trichome quality	:	Absent
❖ Persistence of prickles/trichomes	:	Absent
❖ Outer auricle shape	:	Straight transitional
❖ Inner auricle shape	:	Deltoid
❖ Dewlap waxiness	:	Light
❖ Dewlap shape	:	Triangular with horizontal basal margin
❖ Ligule shape	:	Crescent with lozenge
❖ Stripes on cane	:	Absent
❖ Splits/growth cracks	:	Absent
❖ Corky cracks	:	Absent
❖ Corky patch	:	Absent
❖ Internode shape	:	Conoidal
❖ Alignment	:	Straight
❖ Node swelling	:	Not swollen
❖ Growth ring width	:	Broad
❖ Number of root primordia	:	Two rows
❖ Leaf scar prominence	:	Not prominent
❖ Root band shape	:	Straight
❖ Bud shape	:	Simple ovate
❖ Bud prominence	:	Flat
❖ Bud groove/furrow expression	:	Absent
❖ Bud tip position	:	On growth ring
❖ Bud base position	:	At leaf scar
❖ Number of internodes	:	Twenty three
❖ Solidness	:	Pithy



Fig: Top



Fig: Internode



Fig: Auricle

Accession No.: 57

Name of the germplasm : **I 562-85**

Morphological characters of the germplasm

❖ Plant habit	:	Intermediate
❖ Tillering habit	:	Compact
❖ Tops	:	Light
❖ Leaf carriage	:	Compact
❖ Trashiness	:	Free
❖ Leaf blade texture	:	Smooth
❖ Leaf erectness	:	Curved near middle
❖ Leaf sheath waxiness	:	Light
❖ Presence of prickles/trichomes	:	Absent
❖ Prickle/trichome quality	:	Absent
❖ Persistence of prickles/trichomes	:	Absent
❖ Outer auricle shape	:	Straight transitional
❖ Inner auricle shape	:	Sloping transitional
❖ Dewlap waxiness	:	Light
❖ Dewlap shape	:	Tall, triangular, with convex upper and lower margins
❖ Ligule shape	:	Broad subarcuate
❖ Stripes on cane	:	Absent
❖ Splits/growth cracks	:	Absent
❖ Corky cracks	:	Absent
❖ Corky patch	:	Absent
❖ Internode shape	:	Conoidal
❖ Alignment	:	Straight
❖ Node swelling	:	Swollen
❖ Growth ring width	:	Broad
❖ Number of root primordia	:	Two rows
❖ Leaf scar prominence	:	Prominent
❖ Root band shape	:	Straight
❖ Bud shape	:	Ovate with emarginated wings
❖ Bud prominence	:	Flat
❖ Bud groove/furrow expression	:	Low
❖ Bud tip position	:	Below growth ring
❖ Bud base position	:	At leaf scar
❖ Number of internodes	:	Twenty two
❖ Solidness	:	Solid



Fig: Top



Fig: Internode



Fig: Auricle

Accession No.: 58

Name of the germplasm : **I 19-86**

Morphological characters of the germplasm

❖ Plant habit	:	Erect
❖ Tillering habit	:	Compact
❖ Tops	:	Light
❖ Leaf carriage	:	Compact
❖ Trashiness	:	Intermediate
❖ Leaf blade texture	:	Smooth
❖ Leaf erectness	:	Curved near middle
❖ Leaf sheath waxiness	:	Absent
❖ Presence of prickles/trichomes	:	Absent
❖ Prickle/trichome quality	:	Absent
❖ Persistence of prickles/trichomes	:	Absent
❖ Outer auricle shape	:	Short lanceolate
❖ Inner auricle shape	:	Long lanceolate
❖ Dewlap waxiness	:	Absent
❖ Dewlap shape	:	Triangular with horizontal basal margin
❖ Ligule shape	:	Crescent with lozenge
❖ Stripes on cane	:	Absent
❖ Splits/growth cracks	:	Absent
❖ Corky cracks	:	Absent
❖ Corky patch	:	Absent
❖ Internode shape	:	Cylindrical
❖ Alignment	:	Straight
❖ Node swelling	:	Not swollen
❖ Growth ring width	:	Narrow
❖ Number of root primordia	:	Two rows
❖ Leaf scar prominence	:	Not prominent
❖ Root band shape	:	Straight
❖ Bud shape	:	Squat rhomboid
❖ Bud prominence	:	Bulging
❖ Bud groove/furrow expression	:	Absent
❖ Bud tip position	:	On growth ring
❖ Bud base position	:	Above leaf scar
❖ Number of internodes	:	Twenty eight
❖ Solidness	:	Solid



Fig: Top



Fig: Internode



Fig: Auricle

Accession No.: 59

Name of the germplasm : **I 144-86**

Morphological characters of the germplasm

❖ Plant habit	:	Erect
❖ Tillering habit	:	Compact
❖ Tops	:	Heavy
❖ Leaf carriage	:	Compact
❖ Trashiness	:	Intermediate
❖ Leaf blade texture	:	Smooth
❖ Leaf erectness	:	Curved near middle
❖ Leaf sheath waxiness	:	Medium
❖ Presence of prickles/trichomes	:	Absent
❖ Prickle/trichome quality	:	Absent
❖ Persistence of prickles/trichomes	:	Absent
❖ Outer auricle shape	:	Straight transitional
❖ Inner auricle shape	:	Ascending transitional
❖ Dewlap waxiness	:	Medium
❖ Dewlap shape	:	Triangular with horizontal basal margin
❖ Ligule shape	:	Crescent with lozenge
❖ Stripes on cane	:	Absent
❖ Splits/growth cracks	:	Absent
❖ Corky cracks	:	Absent
❖ Corky patch	:	Absent
❖ Internode shape	:	Conoidal
❖ Alignment	:	Straight
❖ Node swelling	:	Not swollen
❖ Growth ring width	:	Broad
❖ Number of root primordia	:	Irregular
❖ Leaf scar prominence	:	Not prominent
❖ Root band shape	:	Straight
❖ Bud shape	:	Pentagonal
❖ Bud prominence	:	Bulging
❖ Bud groove/furrow expression	:	Absent
❖ Bud tip position	:	On growth ring
❖ Bud base position	:	At leaf scar
❖ Number of internodes	:	Twenty three
❖ Solidness	:	Pithy



Fig: Top



Fig: Internode



Fig: Auricle

Accession No.: 60

Name of the germplasm : **I 323-86**

Morphological characters of the germplasm

❖ Plant habit	:	Erect
❖ Tillering habit	:	Compact
❖ Tops	:	Light
❖ Leaf carriage	:	Open
❖ Trashiness	:	Intermediate
❖ Leaf blade texture	:	Smooth
❖ Leaf erectness	:	Curved near middle
❖ Leaf sheath waxiness	:	Medium
❖ Presence of prickles/trichomes	:	Absent
❖ Prickle/trichome quality	:	Absent
❖ Persistence of prickles/trichomes	:	Absent
❖ Outer auricle shape	:	Ascending transitional
❖ Inner auricle shape	:	Ascending transitional
❖ Dewlap waxiness	:	Medium
❖ Dewlap shape	:	Triangular with horizontal basal margin
❖ Ligule shape	:	Broad crescent
❖ Stripes on cane	:	Absent
❖ Splits/growth cracks	:	Absent
❖ Corky cracks	:	Absent
❖ Corky patch	:	Absent
❖ Internode shape	:	Cylindrical
❖ Alignment	:	Straight
❖ Node swelling	:	Not swollen
❖ Growth ring width	:	Narrow
❖ Number of root primordia	:	Two rows
❖ Leaf scar prominence	:	Not prominent
❖ Root band shape	:	Straight
❖ Bud shape	:	Round with central germ pore
❖ Bud prominence	:	Flat
❖ Bud groove/furrow expression	:	Absent
❖ Bud tip position	:	On growth ring
❖ Bud base position	:	At leaf scar
❖ Number of internodes	:	Twenty four
❖ Solidness	:	Pithy



Fig: Top



Fig: Internode



Fig: Auricle

Accession No.: 61

Name of the germplasm : **I 326-86**

Morphological characters of the germplasm

❖ Plant habit	:	Intermediate
❖ Tillering habit	:	Compact
❖ Tops	:	Light
❖ Leaf carriage	:	Open
❖ Trashiness	:	Free
❖ Leaf blade texture	:	Smooth
❖ Leaf erectness	:	Curved near middle
❖ Leaf sheath waxiness	:	Medium
❖ Presence of prickles/trichomes	:	Absent
❖ Prickle/trichome quality	:	Absent
❖ Persistence of prickles/trichomes	:	Absent
❖ Outer auricle shape	:	Dentoid
❖ Inner auricle shape	:	Long lanceolate
❖ Dewlap waxiness	:	Light
❖ Dewlap shape	:	Tall, triangular, with convex upper and lower margins
❖ Ligule shape	:	Linear crescent
❖ Stripes on cane	:	Absent
❖ Splits/growth cracks	:	Absent
❖ Corky cracks	:	Present
❖ Corky patch	:	Absent
❖ Internode shape	:	Conoidal
❖ Alignment	:	Straight
❖ Node swelling	:	Swollen
❖ Growth ring width	:	road
❖ Number of root primordia	:	Two rows
❖ Leaf scar prominence	:	Prominent
❖ Root band shape	:	Straight
❖ Bud shape	:	Round with wings
❖ Bud prominence	:	Flat
❖ Bud groove/furrow expression	:	Low
❖ Bud tip position	:	Below growth ring
❖ Bud base position	:	Above leaf scar
❖ Number of internodes	:	Twenty seven
❖ Solidness	:	Solid



Fig: Top



Fig: Internode



Fig: Auricle

Accession No.: 62

Name of the germplasm : **I 80-93**

Morphological characters of the germplasm

❖ Plant habit	:	Erect
❖ Tillering habit	:	Compact
❖ Tops	:	Light
❖ Leaf carriage	:	Compact
❖ Trashiness	:	Intermediate
❖ Leaf blade texture	:	Smooth
❖ Leaf erectness	:	Erect to tip
❖ Leaf sheath waxiness	:	Medium
❖ Presence of prickles/trichomes	:	Absent
❖ Prickle/trichome quality	:	Absent
❖ Persistence of prickles/trichomes	:	Absent
❖ Outer auricle shape	:	Sloping transitional
❖ Inner auricle shape	:	Sloping transitional
❖ Dewlap waxiness	:	Medium
❖ Dewlap shape	:	Triangular with horizontal basal margin
❖ Ligule shape	:	Crescent with lozenge
❖ Stripes on cane	:	Absent
❖ Splits/growth cracks	:	Absent
❖ Corky cracks	:	Absent
❖ Corky patch	:	Absent
❖ Internode shape	:	Cylindrical
❖ Alignment	:	Straight
❖ Node swelling	:	Not swollen
❖ Growth ring width	:	Broad
❖ Number of root primordia	:	Two rows
❖ Leaf scar prominence	:	Prominent
❖ Root band shape	:	Straight
❖ Bud shape	:	Simple ovate
❖ Bud prominence	:	Flat
❖ Bud groove/furrow expression	:	Medium
❖ Bud tip position	:	On growth ring
❖ Bud base position	:	At leaf scar
❖ Number of internodes	:	Twenty two
❖ Solidness	:	Pithy



Fig: Top



Fig: Internode



Fig: Auricle

Accession No.: 63

Name of the germplasm : **I 174-93**

Morphological characters of the germplasm

❖ Plant habit	:	Erect
❖ Tillering habit	:	Compact
❖ Tops	:	Heavy
❖ Leaf carriage	:	Compact
❖ Trashiness	:	Intermediate
❖ Leaf blade texture	:	Smooth
❖ Leaf erectness	:	Curved near tip
❖ Leaf sheath waxiness	:	Medium
❖ Presence of prickles/trichomes	:	Absent
❖ Prickle/trichome quality	:	Absent
❖ Persistence of prickles/trichomes	:	Absent
❖ Outer auricle shape	:	Deltoid
❖ Inner auricle shape	:	Long lanceolate
❖ Dewlap waxiness	:	Light
❖ Dewlap shape	:	Triangular with horizontal basal margin
❖ Ligule shape	:	Broad subarcuate
❖ Stripes on cane	:	Absent
❖ Splits/growth cracks	:	Present
❖ Corky cracks	:	Present
❖ Corky patch	:	Absent
❖ Internode shape	:	Cylindrical
❖ Alignment	:	Straight
❖ Node swelling	:	Not swollen
❖ Growth ring width	:	Broad
❖ Number of root primordia	:	Two rows
❖ Leaf scar prominence	:	Prominent
❖ Root band shape	:	Straight
❖ Bud shape	:	Pentagonal
❖ Bud prominence	:	Flat
❖ Bud groove/furrow expression	:	Absent
❖ Bud tip position	:	On growth ring
❖ Bud base position	:	At leaf scar
❖ Number of internodes	:	Twenty eight
❖ Solidness	:	Hollow



Fig: Top



Fig: Internode



Fig: Auricle

Accession No.: 64

Name of the germplasm : **I 14-96**

Morphological characters of the germplasm

❖ Plant habit	:	Intermediate
❖ Tillering habit	:	Compact
❖ Tops	:	Heavy
❖ Leaf carriage	:	Compact
❖ Trashiness	:	Intermediate
❖ Leaf blade texture	:	Smooth
❖ Leaf erectness	:	Curved near tip
❖ Leaf sheath waxiness	:	Medium
❖ Presence of prickles/trichomes	:	Many
❖ Prickle/trichome quality	:	Hard
❖ Persistence of prickles/trichomes	:	Non-deciduous
❖ Outer auricle shape	:	Straight transitional
❖ Inner auricle shape	:	Ascending transitional
❖ Dewlap waxiness	:	Light
❖ Dewlap shape	:	Tall, triangular, with convex upper and lower margins
❖ Ligule shape	:	Crescent with lozenge
❖ Stripes on cane	:	Absent
❖ Splits/growth cracks	:	Absent
❖ Corky cracks	:	Present
❖ Corky patch	:	Absent
❖ Internode shape	:	Conoidal
❖ Alignment	:	Straight
❖ Node swelling	:	Swollen
❖ Growth ring width	:	Broad
❖ Number of root primordia	:	Two rows
❖ Leaf scar prominence	:	Prominent
❖ Root band shape	:	Straight
❖ Bud shape	:	Pentagonal
❖ Bud prominence	:	Bulging
❖ Bud groove/furrow expression	:	Absent
❖ Bud tip position	:	Below growth ring
❖ Bud base position	:	Above leaf scar
❖ Number of internodes	:	Twenty four
❖ Solidness	:	Solid



Fig: Top



Fig: Internode



Fig: Auricle

Accession No.: 65

Name of the germplasm : **I 127-96**

Morphological characters of the germplasm

❖ Plant habit	:	Erect
❖ Tillering habit	:	Compact
❖ Tops	:	Light
❖ Leaf carriage	:	Open
❖ Trashiness	:	Clinging
❖ Leaf blade texture	:	Smooth
❖ Leaf erectness	:	Curved near middle
❖ Leaf sheath waxiness	:	Medium
❖ Presence of prickles/trichomes	:	Absent
❖ Prickle/trichome quality	:	Absent
❖ Persistence of prickles/trichomes	:	Absent
❖ Outer auricle shape	:	Dentoid
❖ Inner auricle shape	:	Short lanceolate
❖ Dewlap waxiness	:	Medium
❖ Dewlap shape	:	Tall, triangular, with convex upper and lower margins
❖ Ligule shape	:	Broad crescent
❖ Stripes on cane	:	Absent
❖ Splits/growth cracks	:	Absent
❖ Corky cracks	:	Absent
❖ Corky patch	:	Present
❖ Internode shape	:	Conoidal
❖ Alignment	:	Straight
❖ Node swelling	:	Swollen
❖ Growth ring width	:	Broad
❖ Number of root primordia	:	Two rows
❖ Leaf scar prominence	:	Prominent
❖ Root band shape	:	Obconoidal
❖ Bud shape	:	Pentagonal
❖ Bud prominence	:	Flat
❖ Bud groove/furrow expression	:	Absent
❖ Bud tip position	:	Below growth ring
❖ Bud base position	:	Above leaf scar
❖ Number of internodes	:	Twenty eight
❖ Solidness	:	Hollow



Fig: Top



Fig: Internode



Fig: Auricle

Accession No.: 66

Name of the germplasm : **I 137-96**

Morphological characters of the germplasm

❖ Plant habit	:	Erect
❖ Tillering habit	:	Compact
❖ Tops	:	Heavy
❖ Leaf carriage	:	Compact
❖ Trashiness	:	Intermediate
❖ Leaf blade texture	:	Smooth
❖ Leaf erectness	:	Curved near middle
❖ Leaf sheath waxiness	:	Heavy
❖ Presence of prickles/trichomes	:	Absent
❖ Prickle/trichome quality	:	Absent
❖ Persistence of prickles/trichomes	:	Absent
❖ Outer auricle shape	:	Straight transitional
❖ Inner auricle shape	:	Ascending transitional
❖ Dewlap waxiness	:	Heavy
❖ Dewlap shape	:	Squarish
❖ Ligule shape	:	Crescent with narrow lozenge
❖ Stripes on cane	:	Absent
❖ Splits/growth cracks	:	Absent
❖ Corky cracks	:	Present
❖ Corky patch	:	Present
❖ Internode shape	:	Conoidal
❖ Alignment	:	Straight
❖ Node swelling	:	Swollen
❖ Growth ring width	:	Broad
❖ Number of root primordia	:	Two rows
❖ Leaf scar prominence	:	Prominent
❖ Root band shape	:	Obconoidal
❖ Bud shape	:	Simple ovate
❖ Bud prominence	:	Bulging
❖ Bud groove/furrow expression	:	Medium
❖ Bud tip position	:	Below growth ring
❖ Bud base position	:	Above leaf scar
❖ Number of internodes	:	Thirty
❖ Solidness	:	Solid



Fig: Top



Fig: Internode



Fig: Auricle

Accession No.: 67

Name of the germplasm : **I 200-96**

Morphological characters of the germplasm

❖ Plant habit	:	Erect
❖ Tillering habit	:	Compact
❖ Tops	:	Heavy
❖ Leaf carriage	:	Compact
❖ Trashiness	:	Intermediate
❖ Leaf blade texture	:	Smooth
❖ Leaf erectness	:	Curved near middle
❖ Leaf sheath waxiness	:	Light
❖ Presence of prickles/trichomes	:	Absent
❖ Prickle/trichome quality	:	Absent
❖ Persistence of prickles/trichomes	:	Absent
❖ Outer auricle shape	:	Deloitd
❖ Inner auricle shape	:	Sloping transitional
❖ Dewlap waxiness	:	Light
❖ Dewlap shape	:	Tall, triangular, with convex upper and lower margins
❖ Ligule shape	:	Crescent with lozenge
❖ Stripes on cane	:	Absent
❖ Splits/growth cracks	:	Absent
❖ Corky cracks	:	Absent
❖ Corky patch	:	Absent
❖ Internode shape	:	Cylindrical
❖ Alignment	:	Straight
❖ Node swelling	:	Not swollen
❖ Growth ring width	:	Broad
❖ Number of root primordia	:	Two rows
❖ Leaf scar prominence	:	Not prominent
❖ Root band shape	:	Straight
❖ Bud shape	:	Ovate with wing broadening toward apex
❖ Bud prominence	:	Flat
❖ Bud groove/furrow expression	:	Absent
❖ Bud tip position	:	On growth ring
❖ Bud base position	:	Above leaf scar
❖ Number of internodes	:	Twenty seven
❖ Solidness	:	Solid



Fig: Top



Fig: Internode



Fig: Auricle

Accession No.: 68

Name of the germplasm : **I 33-97**

Morphological characters of the germplasm

❖ Plant habit	:	Erect
❖ Tillering habit	:	Compact
❖ Tops	:	Light
❖ Leaf carriage	:	Open
❖ Trashiness	:	Clinging
❖ Leaf blade texture	:	Smooth
❖ Leaf erectness	:	Curved near tip
❖ Leaf sheath waxiness	:	Light
❖ Presence of prickles/trichomes	:	Few
❖ Prickle/trichome quality	:	Hard
❖ Persistence of prickles/trichomes	:	Absent
❖ Outer auricle shape	:	Sloping transitional
❖ Inner auricle shape	:	Straight transitional
❖ Dewlap waxiness	:	Light
❖ Dewlap shape	:	More or less triangular, sloping, with horizontal upper margin
❖ Ligule shape	:	Crescent with lozenge
❖ Stripes on cane	:	Absent
❖ Splits/growth cracks	:	Absent
❖ Corky cracks	:	Present
❖ Corky patch	:	Absent
❖ Internode shape	:	Cylindrical
❖ Alignment	:	Straight
❖ Node swelling	:	Swollen
❖ Growth ring width	:	Broad
❖ Number of root primordia	:	Three rows
❖ Leaf scar prominence	:	Prominent
❖ Root band shape	:	Obconoidal
❖ Bud shape	:	Pentagonal
❖ Bud prominence	:	Bulging
❖ Bud groove/furrow expression	:	Absent
❖ Bud tip position	:	On growth ring
❖ Bud base position	:	Above leaf scar
❖ Number of internodes	:	Twenty six
❖ Solidness	:	Pithy



Fig: Top



Fig: Internode



Fig: Auricle

Accession No.: 69

Name of the germplasm : **I 156-97**

Morphological characters of the germplasm

❖ Plant habit	:	Erect
❖ Tillering habit	:	Compact
❖ Tops	:	Light
❖ Leaf carriage	:	Open
❖ Trashiness	:	Intermediate
❖ Leaf blade texture	:	Smooth
❖ Leaf erectness	:	Erect to tip
❖ Leaf sheath waxiness	:	Light
❖ Presence of prickles/trichomes	:	Absent
❖ Prickle/trichome quality	:	Absent
❖ Persistence of prickles/trichomes	:	Absent
❖ Outer auricle shape	:	Deltoid
❖ Inner auricle shape	:	Deltoid
❖ Dewlap waxiness	:	Light
❖ Dewlap shape	:	Tall, triangular, with convex upper and lower margins
❖ Ligule shape	:	Linear crescent
❖ Stripes on cane	:	Absent
❖ Splits/growth cracks	:	Absent
❖ Corky cracks	:	Absent
❖ Corky patch	:	Absent
❖ Internode shape	:	Cylindrical
❖ Alignment	:	Straight
❖ Node swelling	:	Not swollen
❖ Growth ring width	:	Broad
❖ Number of root primordia	:	Two rows
❖ Leaf scar prominence	:	Prominent
❖ Root band shape	:	Straight
❖ Bud shape	:	Roundish with wings
❖ Bud prominence	:	Bulging
❖ Bud groove/furrow expression	:	Absent
❖ Bud tip position	:	On growth ring
❖ Bud base position	:	At leaf scar
❖ Number of internodes	:	Twenty one
❖ Solidness	:	Solid



Fig: Top



Fig: Internode



Fig: Auricle

Accession No.: 70

Name of the germplasm : **I 64-98**

Morphological characters of the germplasm

❖ Plant habit	:	Erect
❖ Tillering habit	:	Compact
❖ Tops	:	Heavy
❖ Leaf carriage	:	Compact
❖ Trashiness	:	Free
❖ Leaf blade texture	:	Smooth
❖ Leaf erectness	:	Curved near tip
❖ Leaf sheath waxiness	:	Medium
❖ Presence of prickles/trichomes	:	Absent
❖ Prickle/trichome quality	:	Absent
❖ Persistence of prickles/trichomes	:	Absent
❖ Outer auricle shape	:	Straight transitional
❖ Inner auricle shape	:	Sloping transitional
❖ Dewlap waxiness	:	Light
❖ Dewlap shape	:	Squarish
❖ Ligule shape	:	Crescent with lozenge
❖ Stripes on cane	:	Absent
❖ Splits/growth cracks	:	Absent
❖ Corky cracks	:	Present
❖ Corky patch	:	Present
❖ Internode shape	:	Cylindrical
❖ Alignment	:	Straight
❖ Node swelling	:	Swollen
❖ Growth ring width	:	Broad
❖ Number of root primordia	:	Two rows
❖ Leaf scar prominence	:	Prominent
❖ Root band shape	:	Straight
❖ Bud shape	:	Pentagonal
❖ Bud prominence	:	Bulging
❖ Bud groove/furrow expression	:	Absent
❖ Bud tip position	:	Below growth ring
❖ Bud base position	:	Above leaf scar
❖ Number of internodes	:	Thirty
❖ Solidness	:	Solid



Fig: Top



Fig: Internode



Fig: Auricle

Accession No.: 71

Name of the germplasm : **I 82-98**

Morphological characters of the germplasm

❖ Plant habit	:	Erect
❖ Tillering habit	:	Compact
❖ Tops	:	Light
❖ Leaf carriage	:	Open
❖ Trashiness	:	Clinging
❖ Leaf blade texture	:	Smooth
❖ Leaf erectness	:	Bent near tip
❖ Leaf sheath waxiness	:	Light
❖ Presence of prickles/trichomes	:	Absent
❖ Prickle/trichome quality	:	Absent
❖ Persistence of prickles/trichomes	:	Absent
❖ Outer auricle shape	:	Sloping transitional
❖ Inner auricle shape	:	Deltoid
❖ Dewlap waxiness	:	Light
❖ Dewlap shape	:	More or less triangular, sloping with horizontal upper margin
❖ Ligule shape	:	Crescent with lozenge
❖ Stripes on cane	:	Absent
❖ Splits/growth cracks	:	Absent
❖ Corky cracks	:	Absent
❖ Corky patch	:	Present
❖ Internode shape	:	Barrel-shaped
❖ Alignment	:	Straight
❖ Node swelling	:	Swollen
❖ Growth ring width	:	Narrow
❖ Number of root primordia	:	Two rows
❖ Leaf scar prominence	:	Prominent
❖ Root band shape	:	Obconoidal
❖ Bud shape	:	Round with central germ pore
❖ Bud prominence	:	Bulging
❖ Bud groove/furrow expression	:	Absent
❖ Bud tip position	:	Below growth ring
❖ Bud base position	:	At leaf scar
❖ Number of internodes	:	Twenty eight
❖ Solidness	:	Solid



Fig: Top



Fig: Internode



Fig: Auricle

Accession No.: 72

Name of the germplasm : **I 98-98**

Morphological characters of the germplasm

❖ Plant habit	:	Erect
❖ Tillering habit	:	Compact
❖ Tops	:	Light
❖ Leaf carriage	:	Open
❖ Trashiness	:	Intermediate
❖ Leaf blade texture	:	Smooth
❖ Leaf erectness	:	Curved near tip
❖ Leaf sheath waxiness	:	Light
❖ Presence of prickles/trichomes	:	Few
❖ Prickle/trichome quality	:	Hard
❖ Persistence of prickles/trichomes	:	Non-deciuous
❖ Outer auricle shape	:	Straight transitional
❖ Inner auricle shape	:	Deltoid
❖ Dewlap waxiness	:	Light
❖ Dewlap shape	:	Tall, triangular, with convex upper and lower margins
❖ Ligule shape	:	Broad crescent
❖ Stripes on cane	:	Absent
❖ Splits/growth cracks	:	Present
❖ Corky cracks	:	Absent
❖ Corky patch	:	Absent
❖ Internode shape	:	Cylindrical
❖ Alignment	:	Zigzag
❖ Node swelling	:	Not swollen
❖ Growth ring width	:	Broad
❖ Number of root primordia	:	Two rows
❖ Leaf scar prominence	:	Not prominent
❖ Root band shape	:	Straight
❖ Bud shape	:	Pentagonal
❖ Bud prominence	:	Flat
❖ Bud groove/furrow expression	:	Absent
❖ Bud tip position	:	Below growth ring
❖ Bud base position	:	At leaf scar
❖ Number of internodes	:	Twenty seven
❖ Solidness	:	Solid



Fig: Top



Fig: Internode



Fig: Auricle

Accession No.: 73

Name of the germplasm : **I 21-00**

Morphological characters of the germplasm

❖ Plant habit	:	Erect
❖ Tillering habit	:	Compact
❖ Tops	:	Light
❖ Leaf carriage	:	Open
❖ Trashiness	:	Free
❖ Leaf blade texture	:	Smooth
❖ Leaf erectness	:	Erect to tip
❖ Leaf sheath waxiness	:	Medium
❖ Presence of prickles/trichomes	:	Absent
❖ Prickle/trichome quality	:	Absent
❖ Persistence of prickles/trichomes	:	Absent
❖ Outer auricle shape	:	Ascending transitional
❖ Inner auricle shape	:	Ascending transitional
❖ Dewlap waxiness	:	Light
❖ Dewlap shape	:	Triangular
❖ Ligule shape	:	Crescent with lozenge
❖ Stripes on cane	:	Absent
❖ Splits/growth cracks	:	Absent
❖ Corky cracks	:	Absent
❖ Corky patch	:	Absent
❖ Internode shape	:	Conoidal
❖ Alignment	:	Straight
❖ Node swelling	:	Depressed
❖ Growth ring width	:	Narrow
❖ Number of root primordia	:	Two rows
❖ Leaf scar prominence	:	Prominent
❖ Root band shape	:	Obconoidal
❖ Bud shape	:	Round with central germ pore
❖ Bud prominence	:	Bulging
❖ Bud groove/furrow expression	:	Absent
❖ Bud tip position	:	Below growth ring
❖ Bud base position	:	At leaf scar
❖ Number of internodes	:	Twenty seven
❖ Solidness	:	Solid



Fig: Top



Fig: Internode



Fig: Auricle

Accession No.: 74

Name of the germplasm : **I 40-00**

Morphological characters of the germplasm

❖ Plant habit	:	Erect
❖ Tillering habit	:	Compact
❖ Tops	:	Heavy
❖ Leaf carriage	:	Compact
❖ Trashiness	:	Intermediate
❖ Leaf blade texture	:	Smooth
❖ Leaf erectness	:	Curved near tip
❖ Leaf sheath waxiness	:	Light
❖ Presence of prickles/trichomes	:	Absent
❖ Prickle/trichome quality	:	Absent
❖ Persistence of prickles/trichomes	:	Absent
❖ Outer auricle shape	:	Straight transitional
❖ Inner auricle shape	:	Straight transitional
❖ Dewlap waxiness	:	Medium
❖ Dewlap shape	:	Tall, triangular, with convex upper and lower margins
❖ Ligule shape	:	Crescent with lozenge
❖ Stripes on cane	:	Absent
❖ Splits/growth cracks	:	Absent
❖ Corky cracks	:	Absent
❖ Corky patch	:	Absent
❖ Internode shape	:	Conoidal
❖ Alignment	:	Straight
❖ Node swelling	:	Not swollen
❖ Growth ring width	:	Broad
❖ Number of root primordia	:	Two rows
❖ Leaf scar prominence	:	Prominent
❖ Root band shape	:	Straight
❖ Bud shape	:	Round with central germ pore
❖ Bud prominence	:	Flat
❖ Bud groove/furrow expression	:	Absent
❖ Bud tip position	:	On growth ring
❖ Bud base position	:	At leaf scar
❖ Number of internodes	:	Twenty three
❖ Solidness	:	Solid



Fig: Top



Fig: Internode



Fig: Auricle

Accession No.: 75

Name of the germplasm : **I 92-00**

Morphological characters of the germplasm

❖ Plant habit	:	Erect
❖ Tillering habit	:	Compact
❖ Tops	:	Light
❖ Leaf carriage	:	Compact
❖ Trashiness	:	Intermediate
❖ Leaf blade texture	:	Smooth
❖ Leaf erectness	:	Curved near middle
❖ Leaf sheath waxiness	:	Medium
❖ Presence of prickles/trichomes	:	Few
❖ Prickle/trichome quality	:	Soft
❖ Persistence of prickles/trichomes	:	Non-deciduous
❖ Outer auricle shape	:	Sloping transitional
❖ Inner auricle shape	:	Sloping transitional
❖ Dewlap waxiness	:	Medium
❖ Dewlap shape	:	More or less triangular, sloping, with horizontal upper margin
❖ Ligule shape	:	Crescent with lozenge
❖ Stripes on cane	:	Absent
❖ Splits/growth cracks	:	Absent
❖ Corky cracks	:	Absent
❖ Corky patch	:	Absent
❖ Internode shape	:	Conoidal
❖ Alignment	:	Straight
❖ Node swelling	:	Not swollen
❖ Growth ring width	:	Broad
❖ Number of root primordia	:	Irregular
❖ Leaf scar prominence	:	Not prominent
❖ Root band shape	:	Straight
❖ Bud shape	:	Ovate with emarginated wings
❖ Bud prominence	:	Bulging
❖ Bud groove/furrow expression	:	Absent
❖ Bud tip position	:	On growth ring
❖ Bud base position	:	At leaf scar
❖ Number of internodes	:	Twenty one
❖ Solidness	:	Solid



Fig: Top



Fig: Internode



Fig: Auricle

Accession No.: 76

Name of the germplasm : **I 68-01**

Morphological characters of the germplasm

❖ Plant habit	:	Intermediate
❖ Tillering habit	:	Compact
❖ Tops	:	Light
❖ Leaf carriage	:	Compact
❖ Trashiness	:	Intermediate
❖ Leaf blade texture	:	Smooth
❖ Leaf erectness	:	Curved near tip
❖ Leaf sheath waxiness	:	Absent
❖ Presence of prickles/trichomes	:	Absent
❖ Prickle/trichome quality	:	Absent
❖ Persistence of prickles/trichomes	:	Absent
❖ Outer auricle shape	:	Sloping transitional
❖ Inner auricle shape	:	Sloping transitional
❖ Dewlap waxiness	:	Medium
❖ Dewlap shape	:	Triangular with horizontal basal margin
❖ Ligule shape	:	Crescent with lozenge
❖ Stripes on cane	:	Absent
❖ Splits/growth cracks	:	Absent
❖ Corky cracks	:	Absent
❖ Corky patch	:	Absent
❖ Internode shape	:	Conoidal
❖ Alignment	:	Straight
❖ Node swelling	:	Not swollen
❖ Growth ring width	:	Broad
❖ Number of root primordia	:	Two rows
❖ Leaf scar prominence	:	Not prominent
❖ Root band shape	:	Straight
❖ Bud shape	:	Ovate with broadening toward apex
❖ Bud prominence	:	Flat
❖ Bud groove/furrow expression	:	Absent
❖ Bud tip position	:	Above growth ring
❖ Bud base position	:	At leaf scar
❖ Number of internodes	:	Twenty
❖ Solidness	:	Solid



Fig: Top



Fig: Internode



Fig: Auricle

Accession No.: 77

Name of the germplasm : **I 108-01**

Morphological characters of the germplasm

❖ Plant habit	:	Erect
❖ Tillering habit	:	Compact
❖ Tops	:	Heavy
❖ Leaf carriage	:	Compact
❖ Trashiness	:	Intermediate
❖ Leaf blade texture	:	Smooth
❖ Leaf erectness	:	Erect to tip
❖ Leaf sheath waxiness	:	Heavy
❖ Presence of prickles/trichomes	:	Many
❖ Prickle/trichome quality	:	Hard
❖ Persistence of prickles/trichomes	:	Deciduous
❖ Outer auricle shape	:	Straight transitional
❖ Inner auricle shape	:	Sloping transitional
❖ Dewlap waxiness	:	Medium
❖ Dewlap shape	:	Tall, triangular, with convex upper and lower margins
❖ Ligule shape	:	Crescent with lozenge
❖ Stripes on cane	:	Absent
❖ Splits/growth cracks	:	Absent
❖ Corky cracks	:	Absent
❖ Corky patch	:	Present
❖ Internode shape	:	Cylindrical
❖ Alignment	:	Straight
❖ Node swelling	:	Swollen
❖ Growth ring width	:	Broad
❖ Number of root primordia	:	Two rows
❖ Leaf scar prominence	:	Prominent
❖ Root band shape	:	Straight
❖ Bud shape	:	Ovate with emarginated wings
❖ Bud prominence	:	Bulging
❖ Bud groove/furrow expression	:	Absent
❖ Bud tip position	:	Below growth ring
❖ Bud base position	:	At leaf scar
❖ Number of internodes	:	Twenty four
❖ Solidness	:	Solid



Fig: Top



Fig: Internode



Fig: Auricle

Accession No.: 78

Name of the germplasm : **I 84-03**

Morphological characters of the germplasm

❖ Plant habit	:	Erect
❖ Tillering habit	:	Compact
❖ Tops	:	Light
❖ Leaf carriage	:	Open
❖ Trashiness	:	Intermediate
❖ Leaf blade texture	:	Smooth
❖ Leaf erectness	:	Curved near middle
❖ Leaf sheath waxiness	:	Light
❖ Presence of prickles/trichomes	:	Absent
❖ Prickle/trichome quality	:	Absent
❖ Persistence of prickles/trichomes	:	Absent
❖ Outer auricle shape	:	Deltoid
❖ Inner auricle shape	:	Deltoid
❖ Dewlap waxiness	:	Light
❖ Dewlap shape	:	More or less triangular, sloping with horizontal upper margin
❖ Ligule shape	:	Crescent with lozenge
❖ Stripes on cane	:	Absent
❖ Splits/growth cracks	:	Absent
❖ Corky cracks	:	Absent
❖ Corky patch	:	Absent
❖ Internode shape	:	Conoidal
❖ Alignment	:	Straight
❖ Node swelling	:	Not swollen
❖ Growth ring width	:	Narrow
❖ Number of root primordia	:	Two rows
❖ Leaf scar prominence	:	Not prominent
❖ Root band shape	:	Straight
❖ Bud shape	:	Round with central germ pore
❖ Bud prominence	:	Flat
❖ Bud groove/furrow expression	:	Absent
❖ Bud tip position	:	On growth ring
❖ Bud base position	:	At leaf scar
❖ Number of internodes	:	Twenty five
❖ Solidness	:	Pithy



Fig: Top



Fig: Internode



Fig: Auricle

Accession No.: 79

Name of the germplasm : **I 111-03**

Morphological characters of the germplasm

❖ Plant habit	:	Erect
❖ Tillering habit	:	Compact
❖ Tops	:	Light
❖ Leaf carriage	:	Open
❖ Trashiness	:	Intermediate
❖ Leaf blade texture	:	Smooth
❖ Leaf erectness	:	Curved near middle
❖ Leaf sheath waxiness	:	Light
❖ Presence of prickles/trichomes	:	Few
❖ Prickle/trichome quality	:	Hard
❖ Persistence of prickles/trichomes	:	Deciduous
❖ Outer auricle shape	:	Deltoid
❖ Inner auricle shape	:	Long lanceolate
❖ Dewlap waxiness	:	Light
❖ Dewlap shape	:	Tall, triangular, with convex upper and lower margins
❖ Ligule shape	:	Linear crescent
❖ Stripes on cane	:	Absent
❖ Splits/growth cracks	:	Absent
❖ Corky cracks	:	Absent
❖ Corky patch	:	Absent
❖ Internode shape	:	Cylindrical
❖ Alignment	:	Straight
❖ Node swelling	:	Not swollen
❖ Growth ring width	:	Broad
❖ Number of root primordia	:	Two rows
❖ Leaf scar prominence	:	Prominent
❖ Root band shape	:	Straight
❖ Bud shape	:	Ovate with broadening toward apex
❖ Bud prominence	:	Bulging
❖ Bud groove/furrow expression	:	Absent
❖ Bud tip position	:	Below growth ring
❖ Bud base position	:	At leaf scar
❖ Number of internodes	:	Twenty four
❖ Solidness	:	Solid



Fig: Top



Fig: Internode



Fig: Auricle

Accession No.: 80

Name of the germplasm : **I 221-03**

Morphological characters of the germplasm

❖ Plant habit	:	Erect
❖ Tillering habit	:	Compact
❖ Tops	:	Heavy
❖ Leaf carriage	:	Compact
❖ Trashiness	:	Intermediate
❖ Leaf blade texture	:	Smooth
❖ Leaf erectness	:	Curved near tip
❖ Leaf sheath waxiness	:	Light
❖ Presence of prickles/trichomes	:	Absent
❖ Prickle/trichome quality	:	Absent
❖ Persistence of prickles/trichomes	:	Absent
❖ Outer auricle shape	:	Sloping transitional
❖ Inner auricle shape	:	Deltoid
❖ Dewlap waxiness	:	Light
❖ Dewlap shape	:	Triangular with horizontal basal margin
❖ Ligule shape	:	Broad crescent
❖ Stripes on cane	:	Absent
❖ Splits/growth cracks	:	Absent
❖ Corky cracks	:	Absent
❖ Corky patch	:	Absent
❖ Internode shape	:	Conoidal
❖ Alignment	:	Straight
❖ Node swelling	:	Not swollen
❖ Growth ring width	:	Broad
❖ Number of root primordia	:	Three rows
❖ Leaf scar prominence	:	Not prominent
❖ Root band shape	:	Conoidal
❖ Bud shape	:	Ovate with emarginated wings
❖ Bud prominence	:	Flat
❖ Bud groove/furrow expression	:	Low
❖ Bud tip position	:	Above growth ring
❖ Bud base position	:	At leaf scar
❖ Number of internodes	:	Twenty eight
❖ Solidness	:	Hollow



Fig: Top



Fig: Internode



Fig: Auricle

Accession No.: 81

Name of the germplasm : **I 6-04**

Morphological characters of the germplasm

❖ Plant habit	:	Erect
❖ Tillering habit	:	Compact
❖ Tops	:	Light
❖ Leaf carriage	:	Compact
❖ Trashiness	:	Clinging
❖ Leaf blade texture	:	Smooth
❖ Leaf erectness	:	Bent near tip
❖ Leaf sheath waxiness	:	Light
❖ Presence of prickles/trichomes	:	Absent
❖ Prickle/trichome quality	:	Absent
❖ Persistence of prickles/trichomes	:	Absent
❖ Outer auricle shape	:	Deltoid
❖ Inner auricle shape	:	Deltoid
❖ Dewlap waxiness	:	Light
❖ Dewlap shape	:	Triangular with horizontal basal margin
❖ Ligule shape	:	Broad crescent
❖ Stripes on cane	:	Absent
❖ Splits/growth cracks	:	Absent
❖ Corky cracks	:	Absent
❖ Corky patch	:	Absent
❖ Internode shape	:	Cylindrical
❖ Alignment	:	Straight
❖ Node swelling	:	Not swollen
❖ Growth ring width	:	Broad
❖ Number of root primordia	:	Two rows
❖ Leaf scar prominence	:	Prominent
❖ Root band shape	:	Straight
❖ Bud shape	:	Pentagonal
❖ Bud prominence	:	Flat
❖ Bud groove/furrow expression	:	Low
❖ Bud tip position	:	Below growth ring
❖ Bud base position	:	At leaf scar
❖ Number of internodes	:	Twenty four
❖ Solidness	:	Hollow



Fig: Top



Fig: Internode



Fig: Auricle

Accession No.: 82

Name of the germplasm : **I 39-04**

Morphological characters of the germplasm

❖ Plant habit	:	Erect
❖ Tillering habit	:	Compact
❖ Tops	:	Light
❖ Leaf carriage	:	Open
❖ Trashiness	:	Free
❖ Leaf blade texture	:	Smooth
❖ Leaf erectness	:	Curved near middle
❖ Leaf sheath waxiness	:	Absent
❖ Presence of prickles/trichomes	:	Absent
❖ Prickle/trichome quality	:	Absent
❖ Persistence of prickles/trichomes	:	Absent
❖ Outer auricle shape	:	Deltoid
❖ Inner auricle shape	:	Dentoid
❖ Dewlap waxiness	:	Light
❖ Dewlap shape	:	More or less triangular, sloping, with horizontal upper margin
❖ Ligule shape	:	Crescent with lozenge
❖ Stripes on cane	:	Absent
❖ Splits/growth cracks	:	Absent
❖ Corky cracks	:	Present
❖ Corky patch	:	Present
❖ Internode shape	:	Cylindrical
❖ Alignment	:	Straight
❖ Node swelling	:	Not swollen
❖ Growth ring width	:	Narrow
❖ Number of root primordia	:	Two rows
❖ Leaf scar prominence	:	Prominent
❖ Root band shape	:	Straight
❖ Bud shape	:	Ovate with emarginated wings
❖ Bud prominence	:	Flat
❖ Bud groove/furrow expression	:	Medium
❖ Bud tip position	:	Below growth ring
❖ Bud base position	:	At leaf scar
❖ Number of internodes	:	Thirty
❖ Solidness	:	Hollow



Fig: Top



Fig: Internode



Fig: Auricle

Accession No.: 83

Name of the germplasm : **I 282-04**

Morphological characters of the germplasm

❖ Plant habit	:	Erect
❖ Tillering habit	:	Compact
❖ Tops	:	Light
❖ Leaf carriage	:	Open
❖ Trashiness	:	Intermediate
❖ Leaf blade texture	:	Smooth
❖ Leaf erectness	:	Curved near middle
❖ Leaf sheath waxiness	:	Light
❖ Presence of prickles/trichomes	:	Few
❖ Prickle/trichome quality	:	Soft
❖ Persistence of prickles/trichomes	:	Non-deciduous
❖ Outer auricle shape	:	Ascending transitional
❖ Inner auricle shape	:	Ascending transitional
❖ Dewlap waxiness	:	Light
❖ Dewlap shape	:	More or less triangular, sloping with horizontal upper margin
❖ Ligule shape	:	Broad crescent
❖ Stripes on cane	:	Absent
❖ Splits/growth cracks	:	Absent
❖ Corky cracks	:	Absent
❖ Corky patch	:	Absent
❖ Internode shape	:	Cylindrical
❖ Alignment	:	Straight
❖ Node swelling	:	Not swollen
❖ Growth ring width	:	Broad
❖ Number of root primordia	:	Two rows
❖ Leaf scar prominence	:	Not prominent
❖ Root band shape	:	Straight
❖ Bud shape	:	Pentagonal
❖ Bud prominence	:	Flat
❖ Bud groove/furrow expression	:	Low
❖ Bud tip position	:	Below growth ring
❖ Bud base position	:	At leaf scar
❖ Number of internodes	:	Twenty eight
❖ Solidness	:	Pithy



Fig: Top



Fig: Internode



Fig: Auricle

Accession No.: 84

Name of the germplasm : **I 189-04**

Morphological characters of the germplasm

❖ Plant habit	:	Erect
❖ Tillering habit	:	Compact
❖ Tops	:	Light
❖ Leaf carriage	:	Compact
❖ Trashiness	:	Clinging
❖ Leaf blade texture	:	Smooth
❖ Leaf erectness	:	Bent near tip
❖ Leaf sheath waxiness	:	Light
❖ Presence of prickles/trichomes	:	Absent
❖ Prickle/trichome quality	:	Absent
❖ Persistence of prickles/trichomes	:	Absent
❖ Outer auricle shape	:	Ascending transitional
❖ Inner auricle shape	:	Dentoid
❖ Dewlap waxiness	:	Light
❖ Dewlap shape	:	Triangular with horizontal basal margin
❖ Ligule shape	:	Crescent with lozenge
❖ Stripes on cane	:	Absent
❖ Splits/growth cracks	:	Absent
❖ Corky cracks	:	Absent
❖ Corky patch	:	Absent
❖ Internode shape	:	Conoidal
❖ Alignment	:	Straight
❖ Node swelling	:	Swollen
❖ Growth ring width	:	Broad
❖ Number of root primordia	:	Two rows
❖ Leaf scar prominence	:	Prominent
❖ Root band shape	:	Straight
❖ Bud shape	:	Ovate with emarginated wings
❖ Bud prominence	:	Bulging
❖ Bud groove/furrow expression	:	Absent
❖ Bud tip position	:	Below growth ring
❖ Bud base position	:	At leaf scar
❖ Number of internodes	:	Twenty one
❖ Solidness	:	Solid



Fig: Top



Fig: Internode



Fig: Auricle

Accession No.: 85

Name of the germplasm : **I 1-05**

Morphological characters of the germplasm

❖ Plant habit	:	Intermediate
❖ Tillering habit	:	Compact
❖ Tops	:	Heavy
❖ Leaf carriage	:	Open
❖ Trashiness	:	Intermediate
❖ Leaf blade texture	:	Smooth
❖ Leaf erectness	:	Curved near middle
❖ Leaf sheath waxiness	:	Light
❖ Presence of prickles/trichomes	:	Absent
❖ Prickle/trichome quality	:	Absent
❖ Persistence of prickles/trichomes	:	Absent
❖ Outer auricle shape	:	Straight transitional
❖ Inner auricle shape	:	Straight transitional
❖ Dewlap waxiness	:	Light
❖ Dewlap shape	:	Tall, triangular, with convex upper and lower margins
❖ Ligule shape	:	Broad crescent
❖ Stripes on cane	:	Absent
❖ Splits/growth cracks	:	Absent
❖ Corky cracks	:	Absent
❖ Corky patch	:	Absent
❖ Internode shape	:	Cylindrical
❖ Alignment	:	Straight
❖ Node swelling	:	Not swollen
❖ Growth ring width	:	Broad
❖ Number of root primordia	:	Two rows
❖ Leaf scar prominence	:	Not prominent
❖ Root band shape	:	Straight
❖ Bud shape	:	Ovate with broadening toward apex
❖ Bud prominence	:	Bulging
❖ Bud groove/furrow expression	:	Absent
❖ Bud tip position	:	On growth ring
❖ Bud base position	:	At leaf scar
❖ Number of internodes	:	Twenty five
❖ Solidness	:	Solid



Fig: Top



Fig: Internode



Fig: Auricle

Accession No.: 86

Name of the germplasm : **I 285-06**

Morphological characters of the germplasm

❖ Plant habit	:	Erect
❖ Tillering habit	:	Compact
❖ Tops	:	Heavy
❖ Leaf carriage	:	Compact
❖ Trashiness	:	Intermediate
❖ Leaf blade texture	:	Smooth
❖ Leaf erectness	:	Curved near middle
❖ Leaf sheath waxiness	:	Light
❖ Presence of prickles/trichomes	:	Absent
❖ Prickle/trichome quality	:	Absent
❖ Persistence of prickles/trichomes	:	Absent
❖ Outer auricle shape	:	Ascending transitional
❖ Inner auricle shape	:	Ascending transitional
❖ Dewlap waxiness	:	Light
❖ Dewlap shape	:	Very sloping, more or less ligulate
❖ Ligule shape	:	Crescent with lozenge
❖ Stripes on cane	:	Absent
❖ Splits/growth cracks	:	Absent
❖ Corky cracks	:	Absent
❖ Corky patch	:	Absent
❖ Internode shape	:	Cylindrical
❖ Alignment	:	Straight
❖ Node swelling	:	Not swollen
❖ Growth ring width	:	Broad
❖ Number of root primordia	:	Three rows
❖ Leaf scar prominence	:	Prominent
❖ Root band shape	:	Straight
❖ Bud shape	:	Simple ovate
❖ Bud prominence	:	Flat
❖ Bud groove/furrow expression	:	Absent
❖ Bud tip position	:	Above growth ring
❖ Bud base position	:	At leaf scar
❖ Number of internodes	:	Twenty three
❖ Solidness	:	Solid



Fig: Top



Fig: Internode



Fig: Auricle

Accession No.: 87

Name of the germplasm : **I 71-07**

Morphological characters of the germplasm

❖ Plant habit	:	Intermediate
❖ Tillering habit	:	Compact
❖ Tops	:	Light
❖ Leaf carriage	:	Open
❖ Trashiness	:	Intermediate
❖ Leaf blade texture	:	Smooth
❖ Leaf erectness	:	Curved near middle
❖ Leaf sheath waxiness	:	Absent
❖ Presence of prickles/trichomes	:	Absent
❖ Prickle/trichome quality	:	Absent
❖ Persistence of prickles/trichomes	:	Absent
❖ Outer auricle shape	:	Sloping transitional
❖ Inner auricle shape	:	Deltoid
❖ Dewlap waxiness	:	Light
❖ Dewlap shape	:	Triangular with horizontal basal margin
❖ Ligule shape	:	Broad crescent
❖ Stripes on cane	:	Absent
❖ Splits/growth cracks	:	Absent
❖ Corky cracks	:	Absent
❖ Corky patch	:	Absent
❖ Internode shape	:	Cylindrical
❖ Alignment	:	Straight
❖ Node swelling	:	Not swollen
❖ Growth ring width	:	Broad
❖ Number of root primordia	:	Three rows
❖ Leaf scar prominence	:	Not prominent
❖ Root band shape	:	Straight
❖ Bud shape	:	Simple ovate
❖ Bud prominence	:	Flat
❖ Bud groove/furrow expression	:	Absent
❖ Bud tip position	:	On growth ring
❖ Bud base position	:	At leaf scar
❖ Number of internodes	:	Twenty two
❖ Solidness	:	Solid



Fig: Top



Fig: Internode



Fig: Auricle

Accession No.: 88

Name of the germplasm : **I 93-07**

Morphological characters of the germplasm

❖ Plant habit	:	Intermediate
❖ Tillering habit	:	Compact
❖ Tops	:	Heavy
❖ Leaf carriage	:	Compact
❖ Trashiness	:	Clinging
❖ Leaf blade texture	:	Smooth
❖ Leaf erectness	:	Curved near tip
❖ Leaf sheath waxiness	:	Light
❖ Presence of prickles/trichomes	:	Few
❖ Prickle/trichome quality	:	Soft
❖ Persistence of prickles/trichomes	:	Deciduous
❖ Outer auricle shape	:	Sloping transitional
❖ Inner auricle shape	:	Deltoid
❖ Dewlap waxiness	:	Light
❖ Dewlap shape	:	Tall, triangular, with convex upper and lower margins
❖ Ligule shape	:	Broad crescent
❖ Stripes on cane	:	Absent
❖ Splits/growth cracks	:	Absent
❖ Corky cracks	:	Absent
❖ Corky patch	:	Absent
❖ Internode shape	:	Conoidal
❖ Alignment	:	Straight
❖ Node swelling	:	Not swollen
❖ Growth ring width	:	Broad
❖ Number of root primordia	:	Two rows
❖ Leaf scar prominence	:	Not prominent
❖ Root band shape	:	Straight
❖ Bud shape	:	Tall deltoid
❖ Bud prominence	:	Flat
❖ Bud groove/furrow expression	:	Medium
❖ Bud tip position	:	Above growth ring
❖ Bud base position	:	At leaf scar
❖ Number of internodes	:	Twenty seven
❖ Solidness	:	Solid



Fig: Top



Fig: Internode



Fig: Auricle

Accession No.: 89

Name of the germplasm : **I 213-07**

Morphological characters of the germplasm

❖ Plant habit	:	Erect
❖ Tillering habit	:	Compact
❖ Tops	:	Heavy
❖ Leaf carriage	:	Compact
❖ Trashiness	:	Intermediate
❖ Leaf blade texture	:	Smooth
❖ Leaf erectness	:	Curved near middle
❖ Leaf sheath waxiness	:	Light
❖ Presence of prickles/trichomes	:	Absent
❖ Prickle/trichome quality	:	Absent
❖ Persistence of prickles/trichomes	:	Absent
❖ Outer auricle shape	:	Deltoid
❖ Inner auricle shape	:	Sloping transitional
❖ Dewlap waxiness	:	Light
❖ Dewlap shape	:	Triangular with horizontal basal margin
❖ Ligule shape	:	Broad crescent
❖ Stripes on cane	:	Absent
❖ Splits/growth cracks	:	Present
❖ Corky cracks	:	Absent
❖ Corky patch	:	Absent
❖ Internode shape	:	Conoidal
❖ Alignment	:	Straight
❖ Node swelling	:	Not swollen
❖ Growth ring width	:	Broad
❖ Number of root primordia	:	Three rows
❖ Leaf scar prominence	:	Not prominent
❖ Root band shape	:	Straight
❖ Bud shape	:	Round with central germ pore
❖ Bud prominence	:	Bulging
❖ Bud groove/furrow expression	:	Low
❖ Bud tip position	:	On growth ring
❖ Bud base position	:	At leaf scar
❖ Number of internodes	:	Twenty four
❖ Solidness	:	Hollow



Fig: Top



Fig: Internode



Fig: Auricle

Accession No.: 90

Name of the germplasm : **I 25-08**

Morphological characters of the germplasm

❖ Plant habit	:	Intermediate
❖ Tillering habit	:	Spreading
❖ Tops	:	Light
❖ Leaf carriage	:	Compact
❖ Trashiness	:	Intermediate
❖ Leaf blade texture	:	Smooth
❖ Leaf erectness	:	Curved near middle
❖ Leaf sheath waxiness	:	Absent
❖ Presence of prickles/trichomes	:	Absent
❖ Prickle/trichome quality	:	Absent
❖ Persistence of prickles/trichomes	:	Absent
❖ Outer auricle shape	:	Straight transitional
❖ Inner auricle shape	:	Ascending transitional
❖ Dewlap waxiness	:	Medium
❖ Dewlap shape	:	Triangular with horizontal basal margin
❖ Ligule shape	:	Crescent with lozenge
❖ Stripes on cane	:	Absent
❖ Splits/growth cracks	:	Absent
❖ Corky cracks	:	Absent
❖ Corky patch	:	Absent
❖ Internode shape	:	Cylindrical
❖ Alignment	:	Straight
❖ Node swelling	:	Not swollen
❖ Growth ring width	:	Broad
❖ Number of root primordia	:	Two rows
❖ Leaf scar prominence	:	Not prominent
❖ Root band shape	:	Straight
❖ Bud shape	:	Simple ovate
❖ Bud prominence	:	Flat
❖ Bud groove/furrow expression	:	Absent
❖ Bud tip position	:	Above growth ring
❖ Bud base position	:	At leaf scar
❖ Number of internodes	:	Twenty three
❖ Solidness	:	Solid



Fig: Top



Fig: Internode



Fig: Auricle

Accession No.: 91

Name of the germplasm : **IC 7a**

Morphological characters of the germplasm

❖ Plant habit	:	Intermediate
❖ Tillering habit	:	Compact
❖ Tops	:	Light
❖ Leaf carriage	:	Compact
❖ Trashiness	:	Intermediate
❖ Leaf blade texture	:	Smooth
❖ Leaf erectness	:	Curved near tip
❖ Leaf sheath waxiness	:	Absent
❖ Presence of prickles/trichomes	:	Absent
❖ Prickle/trichome quality	:	Absent
❖ Persistence of prickles/trichomes	:	Absent
❖ Outer auricle shape	:	Sloping transitional
❖ Inner auricle shape	:	Sloping transitional
❖ Dewlap waxiness	:	Medium
❖ Dewlap shape	:	Triangular with horizontal basal margin
❖ Ligule shape	:	Crescent with lozenge
❖ Stripes on cane	:	Absent
❖ Splits/growth cracks	:	Absent
❖ Corky cracks	:	Absent
❖ Corky patch	:	Absent
❖ Internode shape	:	Conoidal
❖ Alignment	:	Straight
❖ Node swelling	:	Not swollen
❖ Growth ring width	:	Broad
❖ Number of root primordia	:	Two rows
❖ Leaf scar prominence	:	Not prominent
❖ Root band shape	:	Straight
❖ Bud shape	:	Ovate with broadening toward apex
❖ Bud prominence	:	Flat
❖ Bud groove/furrow expression	:	Absent
❖ Bud tip position	:	Above growth ring
❖ Bud base position	:	At leaf scar
❖ Number of internodes	:	Twenty
❖ Solidness	:	Solid



Fig: Top



Fig: Internode



Fig: Auricle

Accession No.: 92

Name of the germplasm : **IC 3c**

Morphological characters of the germplasm

❖ Plant habit	:	Intermediate
❖ Tillering habit	:	Compact
❖ Tops	:	Light
❖ Leaf carriage	:	Open
❖ Trashiness	:	Intermediate
❖ Leaf blade texture	:	Smooth
❖ Leaf Erectness	:	Curved near middle
❖ Leaf sheath waxiness	:	Light
❖ Presence of prickles/trichomes	:	Absent
❖ Prickle/trichome quality	:	Absent
❖ Persistence of prickles/trichomes	:	Absent
❖ Outer auricle shape	:	Straight transitional
❖ Inner auricle shape	:	Sloping transitional
❖ Dewlap waxiness	:	Light
❖ Dewlap shape	:	Triangular with horizontal basal margin
❖ Ligule shape	:	Crescent with lozenge
❖ Stripes on cane	:	Absent
❖ Splits/growth cracks	:	Absent
❖ Corky cracks	:	Absent
❖ Corky patch	:	Absent
❖ Internode shape	:	Conoidal
❖ Alignment	:	Straight
❖ Node swelling	:	Not swollen
❖ Growth ring width	:	Narrow
❖ Number of root primordia	:	Two rows
❖ Leaf scar prominence	:	Not prominent
❖ Root band shape	:	Narrow ovate
❖ Bud shape	:	Absent
❖ Bud prominence	:	Bulging
❖ Bud groove/furrow expression	:	Absent
❖ Bud tip position	:	On growth ring
❖ Bud base position	:	At leaf scar
❖ Number of internodes	:	Twenty nine
❖ Solidness	:	Pithy



Fig: Top



Fig: Internode



Fig: Auricle

Accession No.: 93

Name of the germplasm : **IC 4c**

Morphological characters of the germplasm

❖ Plant habit	:	Erect
❖ Tillering habit	:	Compact
❖ Tops	:	Light
❖ Leaf carriage	:	Compact
❖ Trashiness	:	Intermediate
❖ Leaf blade texture	:	Smooth
❖ Leaf Erectness	:	Curved near middle
❖ Leaf sheath waxiness	:	Light
❖ Presence of prickles/trichomes	:	Absent
❖ Prickle/trichome quality	:	Absent
❖ Persistence of prickles/trichomes	:	Absent
❖ Outer auricle shape	:	Straight transitional
❖ Inner auricle shape	:	Deltoid
❖ Dewlap waxiness	:	Light
❖ Dewlap shape	:	Tall, triangular, with convex upper and lower margins
❖ Ligule shape	:	Crescent with lozenge
❖ Stripes on cane	:	Absent
❖ Splits/growth cracks	:	Present
❖ Corky cracks	:	Absent
❖ Corky patch	:	Absent
❖ Internode shape	:	Cylindrical
❖ Alignment	:	Straight
❖ Node swelling	:	Not swollen
❖ Growth ring width	:	Broad
❖ Number of root primordia	:	Two rows
❖ Leaf scar prominence	:	Not prominent
❖ Root band shape	:	Straight
❖ Bud shape	:	Tall deltoid
❖ Bud prominence	:	Flat
❖ Bud groove/furrow expression	:	Absent
❖ Bud tip position	:	Above growth ring
❖ Bud base position	:	At leaf scar
❖ Number of internodes	:	Twenty four
❖ Solidness	:	Solid



Fig: Top



Fig: Internode



Fig: Auricle

Accession No.: 94

Name of the germplasm : **IC 1d**

Morphological characters of the germplasm

❖ Plant habit	:	Erect
❖ Tillering habit	:	Compact
❖ Tops	:	Light
❖ Leaf carriage	:	Open
❖ Trashiness	:	Intermediate
❖ Leaf blade texture	:	Smooth
❖ Leaf Erectness	:	Curved near tip
❖ Leaf sheath waxiness	:	Medium
❖ Presence of prickles/trichomes	:	Absent
❖ Prickle/trichome quality	:	Absent
❖ Persistence of prickles/trichomes	:	Absent
❖ Outer auricle shape	:	Straight transitional
❖ Inner auricle shape	:	Sloping transitional
❖ Dewlap waxiness	:	Medium
❖ Dewlap shape	:	Triangular with horizontal basal margin
❖ Ligule shape	:	Broad crescent
❖ Stripes on cane	:	Absent
❖ Splits/growth cracks	:	Present
❖ Corky cracks	:	Absent
❖ Corky patch	:	Absent
❖ Internode shape	:	Cylindrical
❖ Alignment	:	Straight
❖ Node swelling	:	Not swollen
❖ Growth ring width	:	Broad
❖ Number of root primordia	:	Irregular
❖ Leaf scar prominence	:	Not prominent
❖ Root band shape	:	Straight
❖ Bud shape	:	Roundish with wings
❖ Bud prominence	:	Flat
❖ Bud groove/furrow expression	:	Absent
❖ Bud tip position	:	Below growth ring
❖ Bud base position	:	At leaf scar
❖ Number of internodes	:	Nineteen
❖ Solidness	:	Solid



Fig: Top



Fig: Internode



Fig: Auricle

Accession No.: 95

Name of the germplasm : **Saipan 17**

Morphological characters of the germplasm

❖ Plant habit	:	Intermediate
❖ Tillering habit	:	Compact
❖ Tops	:	Light
❖ Leaf carriage	:	Open
❖ Trashiness	:	Free
❖ Leaf blade texture	:	Smooth
❖ Leaf Erectness	:	Curved near middle
❖ Leaf sheath waxiness	:	Light
❖ Presence of prickles/trichomes	:	Many
❖ Prickle/trichome quality	:	Hard
❖ Persistence of prickles/trichomes	:	Deciduous
❖ Outer auricle shape	:	Deltoid
❖ Inner auricle shape	:	Straight transitional
❖ Dewlap waxiness	:	Light
❖ Dewlap shape	:	More or less triangular, sloping with horizontal upper margin
❖ Ligule shape	:	Crescent with lozenge
❖ Stripes on cane	:	Absent
❖ Splits/growth cracks	:	Absent
❖ Corky cracks	:	Absent
❖ Corky patch	:	Absent
❖ Internode shape	:	Cylindrical
❖ Alignment	:	Straight
❖ Node swelling	:	Swollen
❖ Growth ring width	:	Broad
❖ Number of root primordia	:	Two rows
❖ Leaf scar prominence	:	Prominent
❖ Root band shape	:	Obconoidal
❖ Bud shape	:	Round with central germ pore
❖ Bud prominence	:	Bulging
❖ Bud groove/furrow expression	:	Absent
❖ Bud tip position	:	Below growth ring
❖ Bud base position	:	Above leaf scar
❖ Number of internodes	:	Thirty four
❖ Solidness	:	Hollow



Fig: Top



Fig: Internode



Fig: Auricle

Accession No.: 96

Name of the germplasm : **SC 5d**

Morphological characters of the germplasm

❖ Plant habit	:	Erect
❖ Tillering habit	:	Compact
❖ Tops	:	Light
❖ Leaf carriage	:	Open
❖ Trashiness	:	Intermediate
❖ Leaf blade texture	:	Smooth
❖ Leaf Erectness	:	Curved near middle
❖ Leaf sheath waxiness	:	Light
❖ Presence of prickles/trichomes	:	Absent
❖ Prickle/trichome quality	:	Absent
❖ Persistence of prickles/trichomes	:	Absent
❖ Outer auricle shape	:	Deltoid
❖ Inner auricle shape	:	Ascending transitional
❖ Dewlap waxiness	:	Light
❖ Dewlap shape	:	Tall, triangular with convex upper and lower margins
❖ Ligule shape	:	Linear crescent
❖ Stripes on cane	:	Absent
❖ Splits/growth cracks	:	Absent
❖ Corky cracks	:	Present
❖ Corky patch	:	Absent
❖ Internode shape	:	Conoidal
❖ Alignment	:	Straight
❖ Node swelling	:	Not swollen
❖ Growth ring width	:	Narrow
❖ Number of root primordia	:	Two rows
❖ Leaf scar prominence	:	Prominent
❖ Root band shape	:	Straight
❖ Bud shape	:	Roundish with wings
❖ Bud prominence	:	Flat
❖ Bud groove/furrow expression	:	Absent
❖ Bud tip position	:	Below growth ring
❖ Bud base position	:	At leaf scar
❖ Number of internodes	:	Twenty five
❖ Solidness	:	Solid



Fig: Top



Fig: Internode



Fig: Auricle

Accession No.: 97

Name of the germplasm : **SC 5b**

Morphological characters of the germplasm

❖ Plant habit	:	Erect
❖ Tillering habit	:	Compact
❖ Tops	:	Light
❖ Leaf carriage	:	Open
❖ Trashiness	:	Free
❖ Leaf blade texture	:	Smooth
❖ Leaf Erectness	:	Bent near tip
❖ Leaf sheath waxiness	:	Medium
❖ Presence of prickles/trichomes	:	Absent
❖ Prickle/trichome quality	:	Absent
❖ Persistence of prickles/trichomes	:	Absent
❖ Outer auricle shape	:	Sloping transitional
❖ Inner auricle shape	:	Deltoid
❖ Dewlap waxiness	:	Medium
❖ Dewlap shape	:	Deltoid
❖ Ligule shape	:	Crescent with lozenge
❖ Stripes on cane	:	Absent
❖ Splits/growth cracks	:	Absent
❖ Corky cracks	:	Present
❖ Corky patch	:	Present
❖ Internode shape	:	Conoidal
❖ Alignment	:	Straight
❖ Node swelling	:	Swollen
❖ Growth ring width	:	Broad
❖ Number of root primordia	:	Two rows
❖ Leaf scar prominence	:	Prominent
❖ Root band shape	:	Obconoidal
❖ Bud shape	:	Ovate with emarginated wings
❖ Bud prominence	:	Flat
❖ Bud groove/furrow expression	:	Absent
❖ Bud tip position	:	Below growth ring
❖ Bud base position	:	Above leaf scar
❖ Number of internodes	:	Twenty eight
❖ Solidness	:	Hollow



Fig: Top



Fig: Internode



Fig: Auricle

Accession No.: 98

Name of the germplasm : **SC 10d**

Morphological characters of the germplasm

❖ Plant habit	:	Erect
❖ Tillering habit	:	Compact
❖ Tops	:	Light
❖ Leaf carriage	:	Open
❖ Trashiness	:	Free
❖ Leaf blade texture	:	Smooth
❖ Leaf Erectness	:	Curved near middle
❖ Leaf sheath waxiness	:	Medium
❖ Presence of prickles/trichomes	:	Absent
❖ Prickle/trichome quality	:	Absent
❖ Persistence of prickles/trichomes	:	Absent
❖ Outer auricle shape	:	Straight transitional
❖ Inner auricle shape	:	Sloping transitional
❖ Dewlap waxiness	:	Medium
❖ Dewlap shape	:	More or less triangular, sloping with horizontal upper margin
❖ Ligule shape	:	Crescent with lozenge
❖ Stripes on cane	:	Absent
❖ Splits/growth cracks	:	Absent
❖ Corky cracks	:	Absent
❖ Corky patch	:	Absent
❖ Internode shape	:	Conoidal
❖ Alignment	:	Straight
❖ Node swelling	:	Swollen
❖ Growth ring width	:	Broad
❖ Number of root primordia	:	Two rows
❖ Leaf scar prominence	:	Prominent
❖ Root band shape	:	Obconoidal
❖ Bud shape	:	Squarish pentagonal with wings set high
❖ Bud prominence	:	Bulging
❖ Bud groove/furrow expression	:	Absent
❖ Bud tip position	:	On growth ring
❖ Bud base position	:	Above leaf scar
❖ Number of internodes	:	Thirty two
❖ Solidness	:	Solid



Fig: Top



Fig: Internode



Fig: Auricle

Accession No.: 99

Name of the germplasm : **SC 2d**

Morphological characters of the germplasm

❖ Plant habit	:	Intermediate
❖ Tillering habit	:	Compact
❖ Tops	:	Light
❖ Leaf carriage	:	Compact
❖ Trashiness	:	Free
❖ Leaf blade texture	:	Smooth
❖ Leaf Erectness	:	Curved near middle
❖ Leaf sheath waxiness	:	Light
❖ Presence of prickles/trichomes	:	Absent
❖ Prickle/trichome quality	:	Absent
❖ Persistence of prickles/trichomes	:	Absent
❖ Outer auricle shape	:	Sloping transitional
❖ Inner auricle shape	:	Ascending transitional
❖ Dewlap waxiness	:	Light
❖ Dewlap shape	:	Tall, triangular, with convex upper and lower margins
❖ Ligule shape	:	Narrow subarcuate
❖ Stripes on cane	:	Absent
❖ Splits/growth cracks	:	Absent
❖ Corky cracks	:	Present
❖ Corky patch	:	Absent
❖ Internode shape	:	Cylindrical
❖ Alignment	:	Straight
❖ Node swelling	:	Not swollen
❖ Growth ring width	:	Broad
❖ Number of root primordia	:	Two rows
❖ Leaf scar prominence	:	Prominent
❖ Root band shape	:	Straight
❖ Bud shape	:	Ovate with emarginated wings
❖ Bud prominence	:	Flat
❖ Bud groove/furrow expression	:	Absent
❖ Bud tip position	:	Below growth ring
❖ Bud base position	:	At leaf scar
❖ Number of internodes	:	Twenty six
❖ Solidness	:	Solid



Fig: Top



Fig: Internode



Fig: Auricle

Accession No.: 100

Name of the germplasm : **ZH 110-65**

Morphological characters of the germplasm

❖ Plant habit	:	Erect
❖ Tillering habit	:	Compact
❖ Tops	:	Light
❖ Leaf carriage	:	Open
❖ Trashiness	:	Intermediate
❖ Leaf blade texture	:	Smooth
❖ Leaf Erectness	:	Curved near middle
❖ Leaf sheath waxiness	:	Light
❖ Presence of prickles/trichomes	:	Absent
❖ Prickle/trichome quality	:	Absent
❖ Persistence of prickles/trichomes	:	Absent
❖ Outer auricle shape	:	Ascending transitional
❖ Inner auricle shape	:	Long lanceolate
❖ Dewlap waxiness	:	Light
❖ Dewlap shape	:	Tall, triangular, with convex upper and lower margins
❖ Ligule shape	:	Crescent with lozenge
❖ Stripes on cane	:	Absent
❖ Splits/growth cracks	:	Absent
❖ Corky cracks	:	Absent
❖ Corky patch	:	Absent
❖ Internode shape	:	Conoidal
❖ Alignment	:	Straight
❖ Node swelling	:	Not swollen
❖ Growth ring width	:	Broad
❖ Number of root primordia	:	Two rows
❖ Leaf scar prominence	:	Not prominent
❖ Root band shape	:	Straight
❖ Bud shape	:	Simple ovate
❖ Bud prominence	:	Bulging
❖ Bud groove/furrow expression	:	Absent
❖ Bud tip position	:	Above growth ring
❖ Bud base position	:	At leaf scar
❖ Number of internodes	:	Twenty eight
❖ Solidness	:	Solid



Fig: Top



Fig: Internode



Fig: Auricle

11. Research Highlights :

Morphological data of one hundred accession including two GI has been collected.

Photographs of including various distinguishable parts for each accession has been taken.

DNA has been isolated from each accession.

Molecular characterization has been done for 37 accession including two GI and 20 varieties.

12. Environmental Screening Matrix:**a. Before the experiment:**

Sl. No.	Environmental issue	Component	Improvement/Deterioration*				Remarks
			Small	Moderate	Large	None	
1	<i>Biodiversity</i>	Flora			+		
		Fauna				√	
		Genetic diversity			+		
		Exotic varieties			+		
		Local varieties/ cultivars			+		
		Hybrids			+		
2	<i>Soil quality</i>	Organic matter		+			
		Chemical fertilizer use		+			
		Soil salinity				√	
		Fertility status		+			
		Microbial activity				√	
		Heavy metal contamination				√	
		Water quality				√	
3	<i>Agro-Chemicals</i>	Pesticide use				√	
		POPs				√	
		IPM				√	
		Pest infestation				√	
		Bio-pesticides				√	
		Health hazard				√	
4	<i>Pollution</i>	Soil			+		
		Water				√	
		Air				√	

b. After the experiment:

Sl. No.	Environmental issue	Component	Improvement/Deterioration*				Remarks
			Small	Moderate	Large	None	
1	<i>Biodiversity</i>	Flora			+		
		Fauna				√	
		Genetic diversity			+		
		Exotic varieties			+		
		Local varieties/ cultivars			+		
		Hybrids			+		
2	<i>Soil quality</i>	Organic matter		+			
		Chemical fertilizer use		+			
		Soil salinity				√	
		Fertility status		+			
		Microbial activity				√	
		Heavy metal contamination				√	
		Water quality				√	
3	<i>Agro-Chemicals</i>	Pesticide use				√	
		POPs				√	
		IPM				√	
		Pest infestation				√	
		Bio-pesticides				√	
		Health hazard				√	
4	<i>Pollution</i>	Soil		+			
		Water				√	
		Air				√	

13. Major Attainments (*in relation to the set objectives*) :

a. Technical : Output, Outcome and Impact

Sl. No	Major technical activities performed in respect of the set objectives	Output (i.e product obtained, visible, measurable)	Outcome (short term effect of the research)	Impact (long term effect of the research)	Remarks (reason, if anything otherwise plus any other)
	To characterize sugarcane varieties and germplasms using morphological characters.	Morphological data has been taken from 2 GI, 29 varieties and 69 germplasm	Germplasm can be divided into cluster to use in breeding programme	It will help the breeder to run the target breeding programme easily	
	To characterize for identification and documentation of sugarcane varieties and germplasm through DNA fingerprinting using molecular markers	DNA has been isolated	Diversity analysis can be done	It will be helpful to minimize the confusion in variety identification	
	Documentation and categorization of sugarcane germplasm for utilization in variety development with desirable traits.	Data has been collected for GI crops and photographs has been taken for all the accession	All the accession can be documented	Scientist especially the breeders as well as the farmers will be benefited in the long run.	

a. Procurement

Sl. No	Approved provisions of Procurement (list major items)	Achievement	% of achievement	Remarks (reason, if anything otherwise)
01.	Small Equipment, Tools, etc.	Has been procured	100	
02.	Furniture and Supplies	Has been procured	100	
03.	Office Supplies	Has been procured	100	
04.	Chemicals	Has been procured	100	

c. HRD/ Training : None

Title (e.g Ph.D/MS/ Trainings, workshops conducted etc.)	Target	Attainments	No. of participants	Benefit of the higher studies/trainings (application of the learning, productivity enhancement)	Remarks (reason, if anything otherwise)

d. Financial

Sl. No	Major Head	Fund received (Tk.)	Expenditure (Tk.)	Balance/Unspent (Tk)	Remarks (reason, if anything otherwise)
01.	Salary & remuneration	178009.00	69200.00	108809.00	
02.	Research expenses	456302.00	400454.00	55848.00	
03.	Operating expenses	160000.00	80000.00	80000.00	
04.	Contingencies	160000.00	80000.00	80000.00	
05.	Capital expenses	420000.00	419350.00	650.00	

e. Materials developed/Publications made : Not applicable

Type of material/publication	Title	Number	Remarks(being used by/meant for/any other)
Technology development	None		
Process development	None		
Information development	Documentation to identify sugarcane accessions		
Journal publication	None		
Books/Monographs/Manual published	None		
Booklet/leaflet/flyer etc. published	None		
Any other(patenting of technology etc.)	None		

14. Sub-project Auditing (cover all types of audit performed)

Types of Audit (e.g BARC/Implementing agency/FAPAD/World Bank/others)	Major observations/issues/objections raised, if any	Status at the sub-project end	Remarks
FAPAD	Nil	Satisfactory	
BARC	Nil	Satisfactory	

15. Reporting

Report type	Actual date of submission(s)	Total Number(s)	Remarks(if anything otherwise)
a. Inception report	25/03/12	01	
b. Monthly reports*	28/03/12(3nos.), 3/4/12,3/5/12,28/5/12, 2/7/12,4/8/12,1/9/12,1/10/12,1/11/12, 1/12/12,21/1/13, 20/2/13,1/3/13, 1/4/13, 12/5/13, 1/6/13, 1/7/13, 1/9/13, 1/10/13, 1/11/13	22	
c. Statement of expdts.(SoE)*	28/03/12(3nos.), 3/4/12,3/5/12,28/5/12, 2/7/12,4/8/12,1/9/12,1/10/12,1/11/12, 1/12/12,21/1/13, 20/2/13,1/3/13, 1/4/13, 12/5/13, 1/6/13, 1/7/13, 1/9/13, 1/10/13, 1/11/13	22	
d. Quarterly report(s)*	28/3/12,2/7/12,15/10/12,31/1/13,12/5/13, 1/7/13, 1/10/13	07	
e. Six monthly report	2/7/12, 1/1/13, 1/8/13	03	
f. Procurement plan	25/03/12	01	
g. Annual research program format	N/A		
h. Environmental monitoring (Annual Basis)			
i. Social safeguard status (Before and at the end)			
j. Field Monitoring Report(s)**	11/10/12,23/1/12,24/12/12, 27/2/13,29/8/13, 29/8/13	06	

* All since start to end.

** Conducted at the local level by implementing agencies.

16. Problems/Constraints :

Lack of continuous power supply hampered the laboratory works. DNA isolation becomes troublesome in some accession due to the of excessive phenolic compound.

17. Suggestion for future, if any :

Morphological and molecular characterization is important for identification and protection of germplasm in IPR issues. BSRI is maintaining more than eleven hundred germplasm. Only one hundred sugarcane germplasm has been documented through this project. So, it is needed to study the rest of the germplasm within near future.

Signature of the Coordinator/Principal Investigator(as applicable)

Date

Seal

Counter signature of the Head of the agency/authorized representative

Date

Seal

List of capital items procured:

Sl.no.	Name	Quantity	Remarks
1.	Morphology study table & tools	01	These are being used in Breeding and Biotechnology Division of BSRI
2.	Digital slide caliper	03	
3.	Digital refractometer	02	
4.	Computer with laser printer	01	

K.M. Rezaul Karim

Senior Scientific Officer

&

PI, CGR-SPGR sub-project

Breeding Division

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